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THE
AGRICULTURAL INDUSTRIES

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“. . . it is nevertheless a maxim, well established by experience, and generally acknowledged, where there has been sufficient experience, that the aggregate prosperity of manufactures and the aggregate prosperity of agriculture are intimately connected.”

ALEXANDER HAMILTON, *Works* (New York, JOHN F. TROW, 1850), Vol. III, p. 241.

The Agricultural Industries

BY

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PREFACE

The preface to any book is the initial contact between the authors and the readers, presenting the opportunity for a momentary and intimate acquaintance between the two. It is important for the reader to know why the volume was prepared and to know the point of view of the writers in presenting their subject matter.

Particularly is this necessary in the field of business, where it is expected that the reader is busy, is desirous of obtaining particular information to meet his own needs, and therefore must know in advance what he may expect to find in the ensuing pages.

This volume on the agricultural industries is designed to present the business aspects of purchasing, processing, financing, and marketing the chief agricultural raw materials entering into American industry and commerce, and to analyze the business problems peculiar to these industries because of their economic, political, and social significance in the life of the nation. These essential industries lie at the very foundation of our business life, in large areas of the country they are fundamental to the prosperity of the community, and in their relation to the Federal government they are inextricably involved in some of the most complex control mechanisms ever undertaken by any government.

It is the aim of the writers to present in brief compass the historical development, statistical position, technical processes, handling methods, and relations to government necessary to an analysis and understanding of the problems faced by the executives in these industries.

The authors have drawn not alone upon published data, but upon over 150 actual business problems collected by them at first hand from these industries for use in a course in the agricultural industries in the Harvard Business School, for the development of which the authors were responsible.

No book of this comprehensive nature represents solely the work of its authors. The problems that formed the basis for much of the material were obtained from many individuals and

companies and were prepared with the assistance of many people. To them the authors extend their thanks.

They are especially grateful to the following men, most of whom are devoting their lives to these industries, who read parts of the manuscript of this book and who, with their advice, criticism, comments, and suggestions, guided the authors in threading their way through the facts and analyses of these industries: W. L. Clayton and Maurice McAshan of the firm of Anderson, Clayton & Co., cotton shippers; Robert Amory, treasurer, Nashua Manufacturing Company; Alston H. Garside, economist, New York Cotton Exchange; A. F. Hunt, vice-president, Swift & Company; John J. Madigan, Armour & Company; George Washington Hill, president, American Tobacco Company; H. P. Hood II, president, H. P. Hood & Sons, milk distributors; O. B. Bromley, National Dairy Products Corporation; Richard C. Fisher, president, International Association of Milk Dealers; John E. Dalton, assistant to vice-president, National Sugar Refining Company, and former chief of the Sugar Section of the Agricultural Adjustment Administration; Alan H. Johnston, controller, and B. F. Lynip, Jr., economic statistician, California and Hawaiian Sugar Refining Corporation, Ltd.; Morris R. Glaser, vice-president, Rosenbaum Brothers, Inc., grain merchants; Kenneth L. Simpson, Grain Exchange Institute; George L. Anderson, member of the firm of Adams & Leland, wool commission merchants; and Rufus Hale of Pacific Mills.

The authors also express their thanks to the many members of the Harvard Business School staff who have helped them in the preparation of the manuscript.

They particularly acknowledge the encouragement and support of Dean Wallace B. Donham of the Harvard Business School, without whose imagination this volume would never have existed.

DEANE W. MALOTT,
BOYCE F. MARTIN.

SOLDIERS FIELD,
BOSTON, MASSACHUSETTS,
October, 1939.

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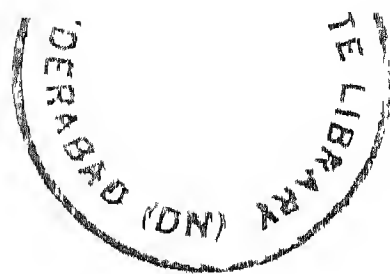
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THE AGRICULTURAL INDUSTRIES

CHAPTER I

THE INDUSTRIES HANDLING AND PROCESSING AGRICULTURAL COMMODITIES

The large industries which have developed in the past century to handle and process agricultural commodities are of great significance both to the agricultural and to the industrial life of the nation. Much attention has been paid to the problems of the farmers, but seldom has this interest extended to the importance of the handlers and the processors of agricultural commodities and their relation to the products sold. Yet the problems of agriculture, and the effect of agricultural problems on general business, are inextricably enmeshed in the business judgments, policies, and techniques of the processors of agricultural raw materials. Each day the executives in these processing industries are making decisions which affect the agricultural situation in numerous and significant ways.

The agricultural industries were formerly household industries. A New England farmer of the 1700's clipped his sheep's wool to make homespun clothing, ground his grain to make flour for bread, churned butter and made cheese, and slaughtered his own livestock for the winter's supply of meat. On southern plantations, sugar cane was pressed for "sweetenin'," tobacco was grown and cured, and some cotton was spun. Now, however, the farmer has concentrated on producing the raw materials and has become a specialist in raising only one or a limited number of farm products; he has passed on to the industrialist the processing functions; and the industrialist in turn has developed mass production, which has required specialized marketing organiza-

tions to distribute the fabricated products to the ultimate consumer.

This development of the agricultural industries has provided an outlet for farm products. These industries have become the funnel through which the consumers' dollars flow to the farm. The farmer is no longer the consumer of his own products, but, in the complexity of the distribution mechanism, has become far removed from the ultimate consumer. Now, for example, the grain producer delivers his wheat to a local elevator and is paid in cash for his product; the elevator owner, with the aid of the local banker, the railroad, a commission merchant in a terminal market, and the highly complex organized exchanges, sells the wheat to a flour mill; the mill sells flour to a large bakery chain; and the bread is sold to retail grocers, who sell it to the final consumer. All the business firms assisting in the marketing and processing of the farmer's product and in the marketing and sale of the processed article are now an integral part of the agricultural system. Consequently, their activities, functions, and business problems are intimately related to the problems of production, prices, and sale of farm products.

The supply of raw materials for the agricultural industries depends on the production of thousands of individual farmers. The farmer usually has a large investment in his land and equipment, frequently one requiring annual principal and interest payments. In addition, he usually has so little working capital that he borrows to cover the out-of-pocket costs incurred while he is cultivating his crop. These out-of-pocket costs do not include a large amount for wages since the farmer and often the members of his family work without wages; they expect their return when the crop is sold. As a consequence the out-of-pocket costs are small, and the fixed charges, consisting chiefly of the payments on loans, taxes, equipment, and the living expenses of the family, would continue regardless of the size of crop raised. In other words, unlike the average businessman, the farmer cannot appreciably lower his costs by curtailing production.

The result is that the individual farmer feels compelled by economic necessity to produce as much as he can; his practical reasoning is that if prices are high, his large production will give him a high profit; while if prices are low, a larger crop will be worth more than a smaller one. Furthermore, the farmer plants

and cultivates as much as he can, knowing that insects, the weather, or other hazards may reduce his crop materially before the harvest season.

Prices of farm products vary, but the production of agricultural commodities does not vary in anywhere near the same amplitude as the prices. The price for the farmer's product of a particular year is not set when he plans his year's production, but later in the season, when the volume and quality of the harvest and many demand factors are known. This condition contrasts with the situation in the steel industry, for example, where, if demand dwindles and prices decline, production is curtailed so that additional supplies will not further depress the market. Furthermore, it takes longer to raise an average crop than to process a typical industrial product; consequently it is impossible to adjust rapidly the supply of agricultural products to the demand. The amount of supplies of farm products is, therefore, entirely out of the hands of the agricultural industries, and price is less effective in regulating supply than it is in other industries.

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The agricultural industries provide the cash income for our farm population, which constitutes 25% of the total population of the country. These same industries handle the essential food and clothing requirements for the 130,000,000 people who live in the United States, as well as for a still substantial export trade. In addition, the agricultural industries themselves provide a livelihood for hundreds of thousands of people, as indicated by the data in Exhibit 1. The number of workers employed, the volume of business transacted, the value of the products manufactured, and the investment of capital funds are of such size that, individually or as a group, these industries are sturdy pillars in the economic structure of the country.

Furthermore, the data in Exhibit 1 do not include all the agricultural industries. No comparable data concerning fluid milk distributors were available, although the volume of business done by the distributors of milk probably exceeds that done by the manufacturers of dairy products. Nor are data included for those engaged in other businesses which might be classified as a part of the agricultural industries. In this latter group would be, for example, the middlemen, such as the wool dealer, the

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EXHIBIT I
VOLUME OF MANUFACTURING AND PROCESSING OPERATIONS OF THE AGRICULTURAL INDUSTRIES IN 1937

	Number of establishments	Average number of wage earners	Wages	Cost of materials*	Value of products
Milk products†.....	9,229	51,550	\$ 55,211,422	\$ 915,979,411	\$ 1,186,272,914
Meat packing.....	1,160	127,476	170,386,207	2,386,090,468	2,787,357,940
Cotton:					
Cotton manufactures‡.....	1,071	422,310	312,488,675	681,039,878	1,257,713,471
Cottonseed oil, cake, and meal§.....	447	16,583	8,531,570	195,746,709	242,042,808
Grains:					
Flour and other grain mill products.....	2,238	26,390	30,185,843	722,710,661	856,310,470
Corn products and starch.....	27	7,011	10,411,461	96,462,119	135,819,685
Distilled liquors.....	151	6,215	7,412,365	73,199,565	113,102,963
Sugar:					
Beet sugar.....	87	9,366	11,732,690	68,996,104	107,395,536
Cane-sugar refining.....	23	14,024	15,973,300	362,652,689	424,630,784
Cane-sugar production.....	72	4,221	2,379,979	20,722,349	29,151,355
Tobacco.....	852	92,158	70,291,395	947,628,432	1,272,687,918
Wool.....	723	160,071	160,144,625	548,715,671	843,352,777
Total, agricultural industries.....	16,080	937,375	\$ 855,149,532	\$ 7,019,944,056	\$ 9,255,838,621
Total, all industries.....	166,794	8,569,231	\$10,112,882,711	\$35,539,332,824	\$60,712,871,737

* Cost of materials, containers, fuel, electric energy, and contract work.

† Includes manufacturers of butter, cheese, condensed and evaporated milk, and ice cream; does not include distributors of fluid milk.

‡ Includes manufacturers of cotton woven goods and cotton yarn and thread; does not include cotton dyeing and finishing.

§ Does not include manufacturers of refined cottonseed oil and cooking oil.

Source: U. S. Department of Commerce, Bureau of the Census, *Census of Manufactures, 1937* (Washington, Government Printing Office), press releases dated Dec. 30, 1938, and May 11, 1939.

cotton shipper, and the commission men in the grain and livestock markets, whose functions and organizations differ with the various types of commodity; those engaged in the storage or transportation of agricultural commodities; bankers and others who assist in financing these businesses; as well as the companies manufacturing or producing commodities primarily for sale to farmers. Even the government might be regarded as an organization engaged in agricultural pursuits, because of interests and activities in controlling supply, in educating farmers and in carrying on agricultural research, in encouraging the establishment of cooperatives and in financing them, and because of its extensive loan program for agricultural commodities.

The total value of the finished products processed by the agricultural industries represents over 15% of the total value of products manufactured by all industries.¹ The percentage is even higher for the cost of materials used, amounting to 20%, since the value added by manufacture is proportionately less for the agricultural industries than for other industries. Several of the agricultural industries stand out in comparison with all other industries: the cotton manufacturing industry employs more workers than any other industry in the country; the meat-packing industry is second only to the automobile industry in total value of products.

The agricultural industries are particularly important to the industrial communities and regions in which they are located, as well as to the farming areas, because they often provide the principal income of the region. The ramifications of the influence of such industries are so far reaching that they must be considered, not as isolated units in the economic structure, but as an essential part of the economic, political, and social organization of the country; as such they are important elements to be reckoned with in the nation's future progress and prosperity.

CHARACTERISTICS OF COMMODITIES PROCESSED BY THE AGRICULTURAL INDUSTRIES

The fact that all the commodities processed by the agricultural industries are products of the farm differentiates the business problems of these industries from those of other industries. Their raw materials come from hundreds and thousands of

¹ See Exhibit 1.

producers, who in sum total are producing a volume of products which is exceedingly difficult to control, and which enters the market in accordance with weather and season determinants that cannot be controlled. Special groups of problems likewise occur in processing because of the peculiar demands of the products themselves. For example, the curing and storage process required for all tobacco products is unique in method, although it can be compared with the lengthy tanning process for leather, the aging process for whiskey, and the aging of cheese. This long process differs radically, however, from the speed with which fresh milk and even fresh meat must be rushed to the market.

One distinctive characteristic of the commodities processed by these industries is that usually the identity of the producer becomes an unimportant factor, since the commodities can be, for the most part, standardized and graded. When they can be bought and sold by description, severe competition exists. The wheat and cotton markets are often cited as examples of pure price competition: there are many sellers and many buyers, the commodities traded in are standardized by grade, and the most important factor is that of price. The political as well as the economic implications of this situation are significant. When a large number of people in the nation produce a product so highly standardized that price is all-important, they suffer severely if prices decline. Consequently, they appeal for help and assistance on the plea that such price declines are certainly not their fault. The resultant political pressure of such a large group is immediately felt by the legislative and administrative bodies of the government.

Because of the number of producers, the concentrated marketing season, and the comparatively standardized commodities which they produce, an efficient, highly developed, far-flung, and frequently complex system is required for the sale and purchase of the raw commodities. Sometimes the marketing system is complex either because of the services to be performed or because it must be geared to handle the year's production within the space of a few weeks. For each commodity, assembly points are established to which the farmer may deliver his annual production. These points differ with each commodity and vary in scope. There is at one extreme the stand on the side of the road where the farmer places his daily supply of milk, and at the other, large

storage warehouses on Summer Street in Boston, where prospective buyers may examine wool sent perhaps by a Wyoming producer. In most cases, however, the first point of assembly is located in the farming region; the wheat producer takes his grain to the local elevator, the southern farmer takes his cotton to a gin, and the livestock producer drives a herd of cattle to a concentration yard at the nearest railroad point.

Most agricultural products must be graded either locally or at the central market, to determine their probable use and the prospective buyer. Furthermore, storage facilities are required when the farmer's crop is harvested in the autumn and when there is no additional production for another year. Sometimes, however, storage cannot stand as an intervening step between farmer and processor because of the perishability of the product; sugar beets and sugar cane, for instance, must be processed into sugar within a relatively short time, with the result that the sugar factory or mill must run night and day for a period following the harvest, after which it closes down until the following harvest. Surplus milk produced during the peak season must be delivered within the space of a few days to a creamery, a cheese factory, or a condensery, after which the processed dairy products are stored until they are withdrawn for consumption.

Most agricultural products are bulky, and their transportation to the central markets adds another series of problems. A large concentration of transportation facilities must be provided in the farming areas at harvest time. When the products arrive at the central markets the marketing functions are specialized, and groups of marketing functionaries have developed to serve as middlemen. The functions of a middleman vary with the commodity, because the customs of the trade and the requirements of the various products have prescribed the methods and channels of distribution. The cotton shipper and the wool dealer purchase large quantities of fibers and store them until a customer with specific requirements comes to them for supplies. The tobacco warehouseman, on the other hand, merely provides a place for buyer and seller to meet, and the tobacco is removed from his warehouse after a very short stay.

In the central markets which have been developed as sources of supply for the agricultural industries, futures markets have also been established. The futures markets grew out of the business

necessity of insuring a future supply of wheat and cotton during a period when transportation schedules were uncertain.¹ These two commodities now account for more than three-fourths of the total futures trading in all commodities. Auction markets for the sale and immediate delivery of other agricultural products have been used extensively, and this type of market is more or less distinctive to the agricultural industries. The tobacco auctions of the South, the wool auctions in Australia and in London, and the fresh vegetable and other produce auctions in the metropolitan markets have evolved as the most satisfactory method of marketing these agricultural products.

Another distinctive characteristic of many agricultural commodities is that their prices are either set or strongly influenced by world markets. The prices for cotton, wool, wheat, sugar, and to a lesser degree, tobacco, are world prices except to the extent to which they are controlled by government action.

The variation in the flow of agricultural products to market is another distinctive characteristic. In the production of all the agricultural industries except milk and livestock the entire supply for the year becomes available at a particular time or season, and after the crop is harvested, the flow from the farm is stopped until another crop is harvested. Even in the case of livestock, the producers typically make heavy shipments during certain seasons of the year, and in the case of milk there are sharp seasonal variations in production.

DISTINCTIVE FEATURES OF THE AGRICULTURAL INDUSTRIES

Since the majority of the farm products now used in industry were formerly processed in the home, the significance of these industries as producers of necessities is apparent. Primarily, the industries described, except tobacco, produce such necessities as food or clothing for the consumers of the country. Even tobacco has come to be almost as essential as food to large numbers of people. The fact that food and clothing are produced gives, on the one hand, a measure of stability as to volume, but, on the

¹ In addition to wheat and cotton, futures markets have also been established for the following agricultural products: barley, butter, canned goods, cheese, corn, cottonseed, cottonseed meal, cottonseed oil, eggs, flaxseed, hides, lard, millfeeds, molasses, oats, peanuts, potatoes, provisions (bellies and ribs), rye, soybeans, sugar, tobacco, and wool tops. U. S. Department of Agriculture, Commodity Exchange Administration, *Trading in Commodity Futures* (Washington, 1938), pp. 7-8.

other, a certain instability in that the products are dependent upon the whims and changes in people's tastes and habits.

In view of the complex and distinctive marketing and distribution systems created for the agricultural commodities, problems and methods of purchasing are distinctive in the agricultural industries. The supply, price, variations in volume of inventories, quality, and methods of procurement are affected because the commodity purchased is a product of the farm and subject to the vagaries of all agricultural raw materials.

Significant variations in supply may result from changes in farming practices, in government activities, or in weather conditions. Such variations have a direct bearing on the location of plants and on the construction of storage facilities, as well as on the buying and inventory policies and sometimes on the merchandising procedures of the agricultural industries. In the case of sugar-beet factories, the necessity of securing an adequate supply of raw material to be processed during the short operating season compels the management of these enterprises to enter into contracts with the producers before the planting season. Government activities and control of cotton production resulted for a period of time in a complete absence of adequate supplies except those obtained through government agencies. In the meat-packing industry a fundamental change in the marketing of livestock affected the supply arriving at the central markets. Increasing amounts of livestock were sold in near-by markets; supplies reaching the central markets declined substantially. As a consequence, the large packing houses were forced to send buyers to interior points to secure a supply of livestock sufficient to keep their central plants operating economically. The processors are constantly aware of the fact that weather conditions may reduce or increase substantially the supply of the commodity in which they are interested and thus affect the quality, price, and amount of materials to be purchased, as well as the value of any finished or unfinished inventory on hand.

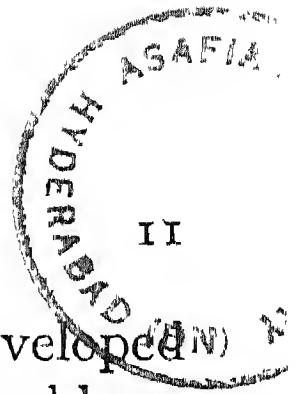
Because price is all-important to the farmer and because the farmers of the country constitute a powerful political pressure group, the government is interested in pegging or raising the prices for farm products; consequently, the complications and problems are increased. For example, a government official today has a large degree of control over the price of sugar. The

Secretary of Agriculture has the authority to establish sugar quotas for the various producing areas and to revise these quotas when, in his opinion, conditions justify such a change. By authorizing changes in quotas and thus varying the supply of sugar for the American market, it appears that the Secretary of Agriculture has considerable control over the differential between the price of sugar in this country and the world price. Under such conditions, the policies of a company in the sugar business are affected to a considerable degree by government action.

The effect of such variations and restrictions of supply on the price of the commodity creates additional problems for the processors. Not only will these variations change the value of inventories held, but high prices resulting from reduced supplies over a period of several years may change the demand for the processed products, through diversion and substitution, in such a way that markets cannot be recovered even after prices have declined.

The annual volume purchased by a processing company is also determined by the peculiarities of these agricultural products. The marketing peak in the raw material which occurs after a crop is harvested creates distinctive problems for the processor of agricultural commodities. In some cases, such as in tobacco, the processing companies must purchase their requirements within a few weeks' time and then store the tobacco for a period of from one to three years. In other cases, middlemen take over this function; wool dealers store wool, cotton shippers hold a supply of cotton, and grain dealers maintain large stocks in terminal elevators. Even where the annual production is not confined to a short period of time, there is a seasonal peak of deliveries; for instance, pork products, butter, and cheese must be stored after the busy season has passed. The problems involved in storing large inventories of agricultural products and the fluctuations in prices resulting from variations in the supply of the commodities directly affect the operating and financial policies of the processing companies. The processor storing an inventory large enough to insure operations until the following season may see his profits disappear or increase beyond his expectations because of price variations. This fact explains the demand for futures markets for these commodities, since the purpose of these exchanges is to limit the amount of the price risk which a handler or processor must assume.

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The complex marketing machinery which has been developed for each of the agricultural products also creates many problems of purchasing policy for the processors. Different types and grades of the commodity are usually not available in one market. The tobacco manufacturer must send buyers to Douglas, Georgia, to Wilson, North Carolina, and to many other markets in the flue-cured tobacco area, as well as to Kentucky and Tennessee for burley and fire-cured tobacco, to Baltimore for Maryland tobacco, and to the Connecticut Valley for certain cigar tobacco. Tobacco varies between regions and between markets and is somewhat different each season. Tobacco buyers must take all these things into account in the ten seconds during which, on the average, a particular lot is being sold in the auction markets. Yet the buyer for a flour mill can examine a 2-pound sample of grain poured from a paper sack on a table in the trading room of the Kansas City Board of Trade and make an intelligent bid for a carload on the basis of this inspection. An entirely different relationship is found between the processor of beet sugar and the grower of sugar beets, for the beet-sugar factory is buying, not beets, but sugar content. The producer delivers his beets to the plant, receives part payment later when the sugar content has been measured, and receives a final settlement only after the sugar has been sold.

Government standards and descriptions have been established for many of the agricultural commodities, and the trend seems to be toward further government grading. While these standards are useful for futures contracts and for commodities which can be bought by description, they frequently do not cover qualities which individual companies require. Many cotton mills have their own names and specifications for the particular types of cotton required for their operations; cotton shippers must know these preferences and requirements. The tobacco companies emphasize flavor, and each company has formulated buying policies which will insure adequate supplies of the particular types of tobacco it prefers. In wool, the qualities required by the manufacturer cannot be entirely reduced to written specifications; since wool varies widely and subtly in quality, the purchase is consummated only after a personal examination by the wool buyer. Livestock is also purchased by individual inspection, and is subject to no great refinement of standardization by grades. For com-

modities which vary as much as most agricultural products do, quality specifications for buying require that purchasing activities be closely supervised by management, or be a function thereof.

Perhaps the most distinctive marketing units for agricultural commodities are the farmers' cooperatives. Established under government sponsorship and in many cases financed by government funds, these cooperatives have resulted in a few outstanding successes and in some notable failures. In both cases, agricultural processors have had to adapt their policies to meet the situation. Some tobacco cooperatives in the 1920's attempted to withhold tobacco from the market to force higher prices but were unsuccessful in the attempt when they could not secure complete control of all the tobacco marketed. Milk bargaining and operating cooperatives have created new operating problems for milk distributors and other businesses in the dairy industry by organizing producers and insisting upon equal treatment for all producers in a milkshed and by establishing organizations in direct competition with the distributors. Successful cooperatives have provided keen competition for established businesses marketing or processing other agricultural commodities. These businesses have been perturbed, not so much by the competition as such, but because government funds have been supplied to the cooperatives for operating capital. These businesses contend that under such conditions, and where margins are already narrow, the cooperatives are given a competitive advantage through the use of cheap or free funds.

In other respects the agricultural industries are not so different from other industries. Some problems of processing are peculiar to each business but to no greater degree than in other types of industries. Any change in process or technique is, however, of great importance to the farmer since the outlet for his product may be directly affected by a change in policy on the part of the processors. The development of a purifying method and the introduction of steel rollers in the flour mills of the Northwest not only provided a market for the hard spring wheat of that region but were instrumental in increasing the total demand for wheat. The recent development of spinning staple rayon fiber on cotton spindles and the creation of new fabrics may affect the eventual demand for the product of the cotton farmer.

Another function of the agricultural industries which is similar to that of other industries is the merchandising and sale of the processed products. But in this area also the business decisions and merchandising policies have a direct effect on the farmer, particularly if demand for the products of these industries is successfully stimulated. If an additional market is provided for the farmer's products by the creation of new demands, the farmer will benefit. The intensive advertising campaigns of the tobacco manufacturers, which created new markets for the flue-cured tobacco used in the manufacture of cigarettes, and the aggressive milk distributors who have developed metropolitan markets for the products of the dairy farmer, show how the agricultural industry can benefit the agricultural producer.

Partly because these industries process farm products and because some of them manufacture food products, they have long been subjected to varying degrees of government control. Meat-packing plants and milk-processing plants have been under some government supervision for many years. Control over these processors, over markets and marketing functions, and, in later years, over prices and supply, creates distinctive problems for these industries, in the solution of which the farmer is as much concerned as the executive. The dairy farmer, for example, is directly affected by the government regulations in his milkshed, because such regulations, if they reduce the returns to the distributor, will also reduce the returns to the farmer. The cotton farmer may benefit temporarily by the virtual pegging of cotton prices through government loans; but if markets are lost to foreign producers by forcing prices out of line, the American farmer will, over the longer run, be adversely affected.

BUSINESS PROBLEMS OF THE AGRICULTURAL INDUSTRIES

The processing of agricultural commodities has a definite bearing on the type and quality of the product which the farmer raises, the price he receives, and the trend of demand for his crop. These processes are essentially business techniques and raise business problems, but it is in the solution of these problems that a large part of the farmer's destiny is determined.

The marketing and consumption of the processed products represent the final phase in the distribution of agricultural commodities. The methods of marketing, trends of consumption,

variations in the demand for the manufactured products, and the possibility of developing new markets all enter into the problems and the economic welfare of the farmer. Price must be considered, as well as the relative elasticity of demand for the product, for only with this knowledge in mind can the proposals for farm relief be intelligently evaluated.

Furthermore, others besides the farmer have acquired an interest in the commodity and have added value to it as they performed necessary services in preparing it for market. The proprietary interest of the farmer, which is concluded at the first point of sale, should not be the sole consideration in an examination of problems relating to farm products.

Problems confronting the agricultural industries are part of the farm problem. Government control, therefore, in the production and marketing of agricultural commodities directly affects the agricultural industries. Maintaining or raising the price on raw materials and imposing a tax on processing may raise the sales price of the processed articles. Such price increases affect consumption; in fact, in some cases it is doubtful that the farmer has been assisted materially by government action. In the long run, the business decisions made by the agricultural industries may, after careful analysis, appear to be more important than the government policies which have received so much publicity.

The business problems confronting all business organizations are present in varying degrees in the agricultural industries. The organization of the working force, labor problems, financial problems, problems of plant layout and operation, the promotion and sale of the product, and research all require executive action in these industries as they do elsewhere; but certain of the decisions made by executives in the solution of these problems take on added importance because of their far-reaching effect on agriculture. Conversely, the decisions of executives are frequently determined in part by farmers and farmers' organizations. The decision of some of the milk distributors to oppose equalization pools by legal action was based on the knowledge that the farmers who maintained the standards of these distributors over a period of years and who cooperated in evening out erratic swings in production would receive lower prices for their milk and would, therefore, lose the price differential which was their incentive to maintain high standards.

The important business problems which confront the business concerns in the major agricultural industries are described in the following chapters. As will be seen upon further examination, each commodity creates distinctive business problems for the companies in that industry. Furthermore, many of the problems confronting the farmer producing a particular commodity require an understanding of the entire industry for proper perspective before intelligent solutions can be suggested. To comprehend the scope of both the farmers' problems and the business problems it is necessary to have some knowledge of the production of that commodity on the farm, to trace its progress through country markets, through central markets, into the processors' hands and, after it is manufactured into a finished product, to observe its flow into the hands of the consumer. An appraisal of the significance and importance of the current business problems of the agricultural industries will then provide some clues to the possible solutions which will contribute to the economic progress of these important groups in our national industrial organization.

CHAPTER II

THE DAIRY INDUSTRY

Milk is produced on a majority of the farms in the United States and provides farmers with the largest return of any single agricultural commodity. Although substantial quantities of milk are consumed on the same farm where the milk is produced, a much larger quantity is produced for sale, either as fluid milk or cream, or for use in the manufacture of butter, cheese, canned milk, and other dairy products. In general, it can be said that all milk as it comes from the cow is essentially the same. There are, of course, differences in the health of the herd and in the sanitary precautions taken during milking; then, too, the proportions of butterfat and nonfat solids will vary within limits. These considerations, however, are far less important in determining the price of milk which the farmer will receive than are such factors as the location of the farm, which determines the market and consequently the use to which the milk will be put, transportation facilities, and the location of processing plants. This condition in the dairy industry contrasts sharply with that in the sugar industry, for sugar can be grown and processed in different areas by entirely different methods and yet result in a product which is the same, sells for approximately the same price, and is used for the same purposes.

Since fluid milk is sold to the ultimate consumer in substantially the same form in which it is produced, comparatively little processing is necessary. The actual collection of fluid milk from the farms and its delivery to consumers requires special transportation facilities and the services of many people. The refrain of "Keep the milk moving" echoes repeatedly as the milk trucks, the milk trains with their glass-lined tank cars, and the distributors' wagons and trucks rush the milk to consumers each day. Furthermore, the physical characteristics of fluid milk, its high degree of perishability, ease of contamination, and its bulk and weight

increase transportation costs and keep the fluid milk business essentially a local industry.

Cream, on the other hand, can be transported greater distances and stored several weeks compared with the two or three days during which fresh fluid milk must be consumed. Manufactured milk products such as butter can be stored for several months; and cheese, casein, powdered milk, condensed milk, and evaporated milk can be put into storage for a year or more.

TYPES OF WHOLE MILK

Milk is not classified by grades, types, and classes to so great an extent as are other agricultural commodities such as cotton, wool, tobacco, and livestock. There are variations in types of milk but these are, for the most part, the result of varying methods used in handling the milk as well as of the use to which it is to be put.

The variations in types of milk are based on such measurements as the percentage of butterfat, which is determined by the breed of cow and types of feed; the bacteria count, which is determined by the care in handling the milk; and the foreign matter and freshness, which are also results of the care in handling the milk after it is produced.

Pressure to improve the quality of fluid milk is exerted both by the municipal inspectors who examine the producers' equipment and enforce municipal ordinances and board of health requirements, and by the distributors who also usually consider themselves the guardians of public health. Herds are examined for evidences of tuberculosis in the cows, and those cows affected must be destroyed if the producer is to maintain his rating. Public authorities also assist in combating the spread of Bang's disease, or infectious abortion, as an aid to the producer in maintaining the health of his herd. This disease, which may be transmitted to humans who consume milk from infected cows, causes undulant fever. The germs of this disease are killed by pasteurization, but there have been no widespread municipal health requirements for tests for Bang's disease similar to those for tuberculosis.

The principal classifications of milk depend, however, on the use to which it is to be put, and the qualities already described pertain for the most part only to fluid milk, that is, milk purchased by the ultimate consumer as whole milk in fluid form. Fluid milk

returns the highest prices to the producer, but this use requires only a third of the milk produced in this country. The remainder is sold in the form of either whole milk or cream for manufacture into butter, cheese, canned milk, or other manufactured dairy products, or is consumed on the farm, used for making butter on the farm, or fed to calves or other livestock. The utilization of milk in an average year is shown in Exhibit 1.

EXHIBIT 1
UTILIZATION OF MILK PRODUCED ON FARMS OF THE UNITED STATES
IN 1934

Uses	Millions of pounds	Per cent
Used as milk or cream on farms where produced.....	12,008	12.1
Used for making butter on farms.....	10,685	10.8
Fed as whole milk to calves.....	2,659	2.7
Skimmed or separated for sale as butterfat.....	33,275	33.6
Sold as milk or market cream:		
Retailed by producers*.....	6,992	7.1
Sold wholesale†.....	33,321	33.7

* Approximations based chiefly on the population in small towns and rural areas where most families purchase their milk directly from farmers. The milk equivalent of cream is included.

† Estimates include milk delivered to creameries, condenseries, cheese factories, market milk receiving stations, etc., but exclude market milk sold to other farmers for local retail delivery.

Source: U. S. Department of Agriculture, AAA, Division of Marketing and Marketing Agreements, Dairy Section, Marketing Information Series, *Some Problems Involved in Establishing Milk Prices*, by E. W. Gaumnitz and O. M. Reed (Washington, Government Printing Office, 1937), Table 5, p. 9.

The use of the milk depends on the location of the producer's farm, on the season of the year, and on the production of milk by others supplying the same market. A producer who meets all the sanitary requirements for fluid milk and usually ships to a fluid milk market may not get a fluid milk price because of excess supplies in the market. If milk cannot be used as fluid milk immediately, one of its most valuable characteristics, its freshness, is lost, and it must be diverted to other uses at proportionately lower prices. It may, for example, be sold to be used in the production of butter and cheese, evaporated milk, condensed milk, powdered or dried milk, casein, or ice cream.

PRINCIPAL PRODUCING AREAS

In 1934, cows were milked during all or part of the year on 76.9% of all farms in the United States; the average number of

cows on these farms was 4.7.¹ These farms are scattered through every state in the Union; in many cases all the milk is consumed on the farm where it is produced. It has been estimated that 53% of the dairy products sold in one form or another are produced on farms having more than 10 cows, however, and that only 10% of the farms reporting cows milked had a herd of that size.²

The important dairies are concentrated in comparatively small areas. Dairy farms were defined by the Bureau of the Census as those on which 40% or more of the farm value of the commodities produced was "derived from milk, cream, butterfat, butter, dairy cows, and calves."³ In the 1930 census it was reported that for the previous year 9.6% of the total of all farms, or 605,000, were dairy farms. Thirty-five per cent of the total number of milk cows reported at that time were on these farms. The average number of cows on these farms was 12, while the average number of cows on other farms was 4.⁴

These dairy farms are located where hay, good pasturage, and concentrated feeds are abundant and where the distance is not too great to metropolitan centers requiring large quantities of fluid milk or to processing plants where milk can be manufactured into other dairy products. The North Central states are the most important milk-producing states, and the North Atlantic states the next most important. The use of the milk produced in these two groups varies, for a large proportion of the milk produced in the North Central states goes into the manufacture of butter, cheese, and canned milk, whereas most of the milk produced in the North Atlantic states is consumed as fluid milk and cream by the dense population in those states.

The 10 most important milk-producing states and their annual production in comparison with the total production in the United States for the years 1934 to 1938 are shown in Exhibit 2.

This exhibit shows the actual poundage of milk produced, but the varying uses change the rank of the states in the manufacture of dairy products. While Wisconsin is the most important milk-

¹ U. S. Bureau of the Census, *Census of Agriculture: 1935, General Report*, Vol. III (Washington, Government Printing Office, 1937), p. 263.

² Black, John D., *The Dairy Industry and the AAA* (Washington, The Brookings Institution, 1935), p. 26.

³ U. S. Bureau of the Census, *15th Census of the United States: 1930, Agriculture*, Vol. IV (Washington, Government Printing Office, 1932), p. 872.

⁴ *Ibid.*, p. 934.

producing state, it is surpassed by Minnesota and Iowa in the production of butter. Wisconsin, however, produces the most cheese and canned milk, two products which require daily deliveries of fresh milk. New York and Pennsylvania are not important producers of butter, although New York is second to Wisconsin in the production of cheese.¹

EXHIBIT 2
TOTAL PRODUCTION OF MILK, 1934-1938
(In Millions of Pounds)

State	1934	1935	1936	1937	1938*
Wisconsin.....	10,659	10,921	11,598	11,378	11,862
Minnesota.....	7,482	7,384	7,745	7,646	8,175
New York.....	6,983	6,956	7,188	7,392	7,424
Iowa.....	6,150	6,009	6,133	5,992	6,445
Illinois.....	5,081	4,873	4,849	4,914	5,106
Pennsylvania.....	4,356	4,498	4,550	4,559	4,627
Ohio.....	4,301	4,364	4,464	4,500	4,570
Michigan.....	4,224	4,257	4,465	4,470	4,560
California.....	4,025	4,047	4,064	4,121	4,145
Texas.....	3,738	3,741	4,011	4,164	4,411
Other states.....	44,529	44,371	44,116	43,996	45,830
Total United States.	101,528	101,421	103,183	103,132	107,155

* Preliminary.

Source: For 1934 and 1935: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 475, p. 342. For 1936: U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 2, February, 1938 (Washington, Government Printing Office), p. 23. For 1937 and 1938: *ibid.*, Vol. 16, No. 2, February, 1939, p. 30.

The dairy industry has trended westward over the last half century as a result of the increased population of the East, the increased efficiency of transportation, and the changes which have taken place in the manufacture of dairy products. The increased population in the East has demanded larger quantities of fluid milk, and the great proportion of the dairy farms in the East produce only for the fluid milk market. The improvements in refrigeration and in transportation have permitted the distributors to reach farther out for the supply of fluid milk for their customers.

Coincident with this increase in demand for fluid milk has been the increase in the number of creameries, the decline in the amount of farm-made butter, and the increase in the number of cheese factories and condenseries. Until 1899 over half the butter

¹ For a further discussion of the manufacture of dairy products, see pp. 32-34.

consumed in this country was made on the farm, but since that time the proportion of butter made on the farm has declined steadily.

The widening market for factory or creamery butter has led to an increase in the number of regions specializing in the production of a particular type of dairy product. New York was the principal dairying state at the close of the Civil War, but in the thirty years following, the production of milk increased at a rapid pace in Iowa, Wisconsin, and Minnesota. During this period the development of the centrifugal separator made possible the immediate separation of milk from cream, either at the creamery or on the farm, replacing generally the slow process of "setting" in pans which was formerly used. Shortly afterwards, the Babcock test for determining percentage of butterfat was developed, with the result that payments to farmers for butterfat could be based on accurate grading rather than on guesswork. These two inventions, along with the increase in the number of creameries, assisted in developing a market for butterfat. The production of milk for cream or butterfat permitted producers to expand their operations in areas where transportation facilities were neither adequate nor speedy. Thus such states as Iowa and Minnesota were favored and butter production increased.

The production of cheese, usually a village industry, requires a daily supply of fresh milk. In this country the industry developed in those areas of Wisconsin and New York which were already producing milk, principally for the Chicago and New York markets.

The process of condensing milk had been invented in 1857, but the production of condensed milk had not expanded rapidly. In the 1880's the so-called "Swiss" process of evaporating milk, an adaptation of the American process, was reintroduced in this country and by 1900 the industry had expanded rapidly. This industry, like the cheese industry, developed chiefly in Wisconsin and New York, since it also requires a fresh supply of milk daily.

PRODUCTION OF MILK

Milk, sold as either whole milk or cream, provides farmers with the largest return of any single agricultural commodity. The cash farm income for 1937 from each of the principal farm products is shown in Exhibit 3.

THE AGRICULTURAL INDUSTRIES

EXHIBIT 3
CASH FARM INCOME IN THE UNITED STATES, 1936 AND 1937

Commodity	Amount (in thousands)	
	1936	1937
Milk.....	\$1,459,182	\$1,530,227
Cattle and calves.....	911,066	986,855
Hogs.....	958,339	901,945
Cotton and cottonseed.....	904,879	863,970
Wheat.....	408,200	666,549
Chickens and eggs.....	596,227	637,312
Truck crops.....	314,887	350,090
Tobacco.....	242,041	318,563
Corn.....	243,665	234,385
All other.....	1,617,893	1,742,972
Total cash farm income for United States.	\$7,656,379	\$8,232,868
Government payments.....	287,252	366,869
Total cash and government payments.....	\$7,943,631	\$8,599,737

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *Gross Farm Income and Government Payments Estimated at \$10,003,000,000 for 1937* (Washington, Mimeographed, May 21, 1938), Table 3, pp. 6-7.

The production of milk varies with the type and amount of feed given to the cows and with the type of breed. The cost of feeds and pasturage represents about 60% of the gross cost of milk production.¹ There are three principal kinds of feed: concentrates, roughage, and pasturage. Concentrates include home-grown or purchased grain, and millfeeds such as cottonseed meal. Roughage consists of hay, corn fodder, and straw. Because of the cost of feeds, marginal producers are inclined to depend primarily on pasturage and hay, which obviously reduces the cash outlay necessary for the production of milk.

Another important item in the cost of producing milk is labor, which usually averages about 30% of the total cost. Milking is the most important task for dairy labor, since this must be done twice a day. Other chores for which labor is necessary are feeding and watering the herd, cleaning the barn, and separating and icing the milk. The amount of labor required for milking is reduced by approximately half with the use of milking machines. The use of these machines makes necessary a capital investment which not all dairy farmers are in a position to make. Studies

¹ U. S. Tariff Commission, *Milk and Cream* (Washington, Government Printing Office, 1929), p. 11.

made in Maine and Rhode Island indicated that approximately 30% of the farms had milking machines.¹ For herds of 12 or less, only 12% of the dairymen used milking machines, while for herds of 16 cows or more the proportion increased to 70%.² These machines are installed by owners of larger herds despite the fact that it is typical for the hours of labor required per cow to decrease as the size of the herd increases. Milk production per cow, however, is higher for the larger herds than for smaller herds. Better and more scientific feeding and breeding are largely responsible for this latter fact.

The economic size of herd is difficult to determine, and the average size varies considerably between states. For example, in 1933 the average number of cows in herds supplying milk to the East Bay cities in California was 103. The average number of cows per herd in the Los Angeles milkshed was 56, and in the Fresno milkshed, 40.³ These figures compare with an average of 21 cows per herd in northern Vermont, 19 in northern New York, 15 in Wisconsin, Iowa, and Minnesota, and 10 in Maine and New Hampshire.⁴ The census figures are much lower since they include data for all farms, on many of which no milk is sold. The 1935 census reporting number of cows milked showed an average of 11.6 cows per farm in Wisconsin and Vermont, 9.6 cows per farm in New York, 9.3 in Minnesota, and 7.3 in Iowa, compared with the nation's average of 4.7 per farm.⁵

Relatively few dairy herds are entirely purebred. In a typical sample of the herds in the Norfolk milkshed, less than 40% of the herds were composed of a single breed.⁶ In Maine only 15% of

¹ Maine Agricultural Experiment Station, Bulletin No. 361, *Costs and Returns in Producing Milk, Raising Heifers and Keeping Herd Bulls in Maine* (Orono, January, 1932), p. 91; and Agricultural Experiment Station of the Rhode Island State College, Bulletin No. 219, *Practices on Rhode Island Dairy Farms* (Kingston, July, 1929), p. 29.

² Maine Agricultural Experiment Station, Bulletin No. 361, p. 91.

³ University of California Agricultural Experiment Station, Bulletin No. 559, *An Analysis of the Fresno Milk Market*, by J. M. Tinley (University of California, Berkeley, October, 1933), pp. 16-17. One important reason for the large size of herds in the East Bay milkshed is the fact that all dairy farms shipping milk into the East Bay are required to install mechanical cooling equipment. Such a large capital investment, to be economical, requires a large production of milk.

⁴ Vermont Agricultural Experiment Station, Bulletin No. 307, *Studies in Vermont Dairy Farming*, VI, "The Position of Northern Vermont among American Dairy Farming Regions," by J. L. Hills (University of Vermont, Burlington, November, 1929), p. 11.

⁵ U. S. Bureau of the Census, *Census of Agriculture: 1935*, *op. cit.*, p. 263.

⁶ Virginia Agricultural Experiment Station, Bulletin No. 298, *An Economic Study of Dairy Farming in the Norfolk Milkshed*, by J. J. Vernon, W. H. Fippia, and

the cows in a survey of 1,802 herds were purebred.¹ The principal breeds of milk cows are Holstein, Jersey, Guernsey, and Ayrshire. The Shorthorn is the most important dual-purpose breed. The Holstein and Jersey breeds are the most popular, with Guernseys next in importance. The Holstein breed is noted for its volume of milk production, although the butterfat content of the milk is relatively low. The Jersey breed typically produces milk with a higher butterfat content than the Holstein. The Guernsey breed has increased in importance because it produces good table milk in large quantities, with an ample percentage of butterfat. Guernsey milk is noted also for its rich golden color, which is attractive to the consumer.

The average annual milk production per cow in the United States is approximately 4,000 pounds, or 465 gallons. The yield varies in the different sections of the country, being lowest in the Southern states and highest in the Middle Atlantic states, Wisconsin, and California. The yield also varies seasonally, as may be seen in Exhibit 4, which shows the monthly variation in milk production in a typical dairying state.

EXHIBIT 4

1934 RECEIPTS OF MILK AND CREAM FOR ALL DEALERS OPERATING
IN PENNSYLVANIA
(Expressed in per cent of daily average)

January.....	89	May.....	120	September.....	99
February.....	92	June.....	123	October.....	94
March.....	95	July.....	109	November.....	87
April.....	101	August.....	104	December.....	87

Source: Pennsylvania State College Experiment Station, Bulletin No. 327, *The Supply and Utilization of Milk in Pennsylvania* (State College, April, 1936), p. 34.

The seasonal increase in the production of milk in the spring is a result of the fact that green pasturage begins to be available at this time and the fact that most calves are born in the spring. During the following three or four months the yield of milk per cow is relatively high; it then declines gradually until the cow goes dry. The average lactation period of a cow is ten months. A cow usually goes dry at least six weeks before a calf is dropped.

H. N. Young (Virginia Polytechnic Institute, Blacksburg, February, 1935), Table 9, p. 19.

¹ Maine Agricultural Experiment Station, Bulletin No. 367, *An Economic Study of the Production and Utilization of Milk in Maine* (University of Maine, Orono, July, 1933), p. 305.

This seasonal change in the production of milk results in a seasonal variation in the price received by farmers. This variation is shown by Exhibit 5.

EXHIBIT 5
AVERAGE PRICES RECEIVED BY FARMERS PER 100 POUNDS OF MILK
1936-1939

Date	1936	1937	1938	1939
January 15.....	\$1.93	\$2.05	\$2.10	\$1.81
February 15.....	1.91	2.02	1.98	1.72
March 15.....	1.82	1.98	1.88	1.59
April 15.....	1.72	1.87	1.72	1.49
May 15.....	1.64	1.79	1.57	.....
June 15.....	1.64	1.75	1.52	.....
July 15.....	1.82	1.82	1.56	.....
August 15.....	1.97	1.91	1.60	.....
September 15.....	2.02	2.02	1.67	.....
October 15.....	2.04	2.11	1.75	.....
November 15.....	2.10	2.22	1.81	.....
December 15.....	2.08	2.22	1.85	.....

Source: For 1936 and 1937: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 484, p. 351. For 1938 and 1939: current issues of U. S. Department of Agriculture, *Crops and Markets* (Washington, Government Printing Office).

In the processing of milk, as in the processing of tobacco, the first step takes place on the farm. In the milksheds of the larger cities, this initial preparation includes straining and cooling the milk. The producer who distributes his own milk must bottle the milk for delivery. In butter-producing areas the farmer usually separates the milk on the farm and ships only the cream to market.

In the areas where milk can be sold as fluid milk, all dairy farmers are desirous of having as much of their milk as possible sold for this use, since fluid milk returns the highest price to the farmer.¹ Sanitary requirements of local and state milk boards require a differentiation between types of milk for human consumption. The highest quality milk in this category is "certified" milk, which sells for several cents a quart more than standard grades. Dairies supplying this milk are under rigid supervision and are inspected frequently. Their procedure and techniques of handling the milk must be approved and certified by the milk commission of the county or by the city medical society or some

¹ For a further discussion of the price relationship between fluid milk and milk for other uses, see pp. 46-54.

other authoritative group. The maximum bacteria count permitted is usually 10,000 per cubic centimeter for this grade of milk, although the limit is set lower in some communities. Grade A, either raw or pasteurized, is the usual grade next below certified. Dairies supplying this milk are also inspected regularly. The bacteria count permitted for raw Grade A milk ranges from 25,000 to 50,000 per cubic centimeter, and for pasteurized milk, when delivered to the consumer, usually from 15,000 to 25,000. Many large metropolitan areas, as, for example, New York, Boston, and Detroit, do not permit the sale of raw milk (other than certified milk) but require that all milk be pasteurized before sale.¹ Other grades of milk are known by different names in various communities and are called "Grade B," "family," or "special." The requirements are not so strict for these grades, and as a consequence the milk is sold for a cent or two less a quart than is Grade A. There are usually requirements as to the minimum percentage of butterfat, typically set at 3.2% or 3.3%, and a minimum percentage of nonfat solids, of between 5% and 9%.

Farmers producing milk to be sold as fluid milk attempt to keep the quality well above the minimum requirements. Some distributors pay better prices for milk of a quality higher than the minimum standards or require their fluid milk producers to maintain quality at levels above those set by the municipal or state authorities. An official of one large milk-distributing firm stated that frequently the milk sold as Grade B or family grade was of as high or higher quality than the minimum standards set for Grade A, since this milk was usually purchased from producers who were striving for a rating which would permit them to sell their milk as Grade A.

Conforming to the sanitary requirements imposes a financial burden on the milk producer, both for capital outlay and for operating expenses. The capital outlay is required both for farm and dairy buildings and for the herd. The dairy farm is rated by inspectors on such items as ventilation, light, screening, manure disposal, and general cleanliness of the dairy and the utensils.²

¹ It has been estimated that 90% of the milk consumed in cities of 10,000 or more is pasteurized. Hamilton, Walton, and Associates, *Price and Price Policies* (New York, McGraw-Hill Book Company, Inc., 1938), p. 455.

² The inspectors arrive without warning and space their visits in so far as possible so that the dairy farm owner will not be able to guess correctly the date of their next visit.

Meeting these requirements usually involves having a large barn with ample window space and concrete floors, and one which receives frequent applications of whitewash. The dairy herd is inspected regularly, and the operator must immediately dispose of any cow reacting unfavorably to the tuberculin test. There are also requirements as to cooling facilities and as to the promptness with which the milk is cooled to the required temperature after being taken from the milking room. Care in handling the milk is, of course, essential. Cream in some instances is not subjected to the same sanitary inspections. On the other hand, cream entering the New York market, for example, must be produced on farms inspected and approved by the same authorities who inspect the sources of fluid milk.

The producers of milk which is to be used in the manufacture of dairy products are not subjected to such stringent sanitary requirements. Much butter is made from sour cream; consequently the necessity of keeping the cream cool is not so urgent as in the case of fluid milk. Milk to be used for cheese or evaporated milk is delivered daily, but sanitary requirements are not so rigid. In the case of cheese, however, freshness as well as the absence of objectionable odors resulting from feeds is important. Milk to be evaporated is first pasteurized so that the variations in sanitary precautions taken by the various producers are relatively unimportant.

The producer-distributors,¹ who sell 7% of the total milk produced, must, of course, bottle milk in addition to performing the other functions of the milk producer. Since these dairymen operate for the most part in small villages and towns, sanitary requirements are generally not so rigid. Those operating in large cities must, of course, be inspected and approved.

TRANSPORTATION OF MILK AND CREAM

It is evident that the amount and type of transportation of milk and cream depend not only upon the location of the producer but also upon the use for which the milk and cream are intended. In the case of fluid milk, the type of transportation will vary from a glass-lined tank car shipped several hundred miles to a truck or wagon owned by the producer who delivers milk to the neighbors in a near-by village.

¹ See p. 34.

Fluid milk is transported largely by truck either from a country receiving station or direct from the producer's farm. Although formerly considerable quantities of milk were transported by railroad, the only important markets now receiving substantial quantities of milk by railroad are Boston, which receives 84% of its shipments by rail; New York, which receives 63%; and Chicago and Philadelphia, each of which receives approximately a third of its supply by rail.¹

The producer of fluid milk either ships his milk to a country receiving station or direct to a distributor in the market. The farmer may truck his milk to either place in his own truck, or he may put it on a roadside stand to be picked up later by a truck hired for this service by a number of producers, or by a truck operated by the distributor who owns the country receiving station, or by one owned by the cooperative operating the country station.

The country station receives the milk from producers in the near-by territory, and weighs, tests, and cools the milk. It is then prepared for shipment to the market in tank cars and trucks, or in carloads or truckloads of 40-quart cans. In periods of surplus production, the country station may also process surplus milk into butter or other manufactured milk products. With the increase in the quantity of milk transported directly to market by truck, the number of country stations has declined. They are still important, however, in connection with such markets as Boston, New York, and Philadelphia, for which fluid milk is secured from points 200 to 300 miles distant and to which a large proportion of the milk is shipped in tank cars. In the Philadelphia district, over 90% of the milk shipped by train was transported in tank cars. In a two-week period in 1935 the milk received by rail in the Boston market was transported as follows: in tank cars, 60.1%; in carlots in 40-quart cans, 16.0%; in carlots in bottles, 6.9%; in less than carlots in 40-quart cans, 17.0%.²

Very little bottling is done at country points except by the producer-distributor, although the Bellows Falls Cooperative

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 13, *Transportation of Milk in the Philadelphia Milkshed*, by John J. Scanlan (Washington, Government Printing Office, 1937), p. 26.

² U. S. Department of Agriculture, AAA, Dairy Section, Series on Marketing Agreements and Orders, Paper No. 12, *Economic Brief with Respect to the Proposed Amendment to Order No. 4 for the Greater Boston, Mass., Marketing Area* (Mimeographed, 1937), p. 29.

Creamery, Inc., processes, pasteurizes, and bottles milk in Bellows Falls, Vermont, and ships the milk in bottles to Boston to be sold over the counter by the First National Stores, a large grocery chain.¹

The transportation of cream for consumption in fluid form is similar to that of fluid milk except that cream is usually shipped in 40-quart cans. The cooling facilities are the same, and many large distributors consider that it is just as important as in the case of milk to ship the cream to market quickly in order that it may retain its freshness. In general, however, cream is shipped greater distances and stored longer than fluid milk.

The shipment of cream for use in the manufacture of butter is quite a different problem since butter can be churned from sour cream, and milk for this purpose is usually produced in areas other than those producing for the fluid-milk market. The farmer producing milk solely for butterfat usually ships his cream only two or three times a week, although in some areas daily deliveries are made since a premium is paid for sweet cream.

The type of transportation for cream to be used in the manufacture of butter depends on the organization of the creamery purchasing milk. There are two types of creameries, the local and the centralizer. The local creamery may be owned and operated privately or cooperatively. This type of creamery flourishes where the production of milk is concentrated and where the farmers deliver their cream direct to the creamery, or where the creamery operates or hires a truck to pick up cream at the farms. In Wisconsin and Minnesota this type of local collection of cream is the most important method used. The number of local creameries, particularly those operated cooperatively, has increased in recent years in Iowa.²

The centralizer system developed after the establishment of many local creameries in territories where there was not an adequate supply of milk to permit efficient operations. The difference between the local creamery and the centralizer is largely in methods of securing cream, although typically the centralizers

¹ U. S. Federal Trade Commission, *Distribution and Sale of Milk and Milk Products*, House Document No. 501, Seventy-fourth Congress, Second Session (Washington, Government Printing Office, 1936), p. 27.

² U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 14, *Cooperative Organization of Iowa Farmers' Creameries*, by Frank Robotka and Gordon C. Laughlin (Washington, Government Printing Office, 1937), p. 1.

produce substantially larger quantities of butter than do the locals. The centralizer secures its cream by operating its own cream-buying stations over a wide territory, or by commissioning local agents to purchase cream, and this cream is then "centralized" at the creamery by truck or rail shipment. The centralizer can thus operate in a territory where production per farm and per square mile is lower than in the concentrated milk-producing areas where local creameries are successful.

For this reason centralizers have been important purchasers of butter in such states as Nebraska,¹ Missouri,² Kansas, and Illinois, and while still important in Iowa, the local creameries have in recent years produced an increasing proportion of the butter manufactured in this state. An additional advantage of the centralizer is that its larger volume of operations permits it to sell butter under its own brand and deal directly with wholesalers and chain stores in the principal butter-consuming markets.

Some of the important centralizers include such large firms as Swift & Company, Armour & Company, Beatrice Creamery, Inc., and the Blue Valley Creamery Company. Cooperative centralizers have been operating in Nebraska for a number of years. Some large-scale cooperatives such as the Land O'Lakes Creameries, Inc., and the Challenge Cream and Butter Association have been organized in recent years to market the products of the local cooperative creameries. These can hardly be called centralizers, however, since the local creameries manufacture the butter which is turned over to the association to be marketed under its brand name.

The milk delivered to cheese plants is usually transported daily by the farmers' wagons or trucks, for these establishments are small and located in close proximity to an ample supply of fresh milk. The farmers usually deliver the milk themselves, or take turns in hauling milk to the cheese factory.³

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 11, *Organization and Operating Problems of Nebraska Cooperative Creameries*, by T. G. Stitts and Gordon C. Laughlin (Washington, Government Printing Office, 1937), p. 5.

² Missouri Agricultural Experiment Station, Bulletin No. 267, *Developing New Markets for Missouri Butterfat* (Columbia, February, 1929), p. 9.

³ Wisconsin Agricultural Experiment Station, Research Bulletin No. 100, *American Cheese Factories in Wisconsin*, by Henry H. Bakken (Madison, August, 1930), p. 5; and Michigan Agricultural Experiment Station, Special Bulletin No. 189, *The Marketing of Michigan Milk*, by F. T. Riddell and J. T. Horner (East Lansing, February, 1929), p. 18.

Milk to be processed into evaporated or condensed milk must also be delivered fresh daily. These condenseries usually operate truck routes to collect the milk from the farmers, since the amount of milk which they require, considerably more than that for cheese factories, must be collected and hauled from a wide area.

PROCESSING OF FLUID MILK

Except in the case of the producer-distributor, the processing of fluid milk usually is done in the plant of the city distributor. When the whole milk arrives at the city plant, it is weighed, examined for flavor and odor, and sampled for butterfat. Samples also are taken for sediment tests and bacteria counts. The milk then is pumped into a storage vat and passes from there to a pre-heater where the milk is warmed to approximately 100 degrees Fahrenheit. Next, any sediment or foreign particles are removed, either by a filter through which the milk is forced by pressure or by a clarifier which operates by centrifugal force.

Pasteurization follows the cleaning process. Practically all states have legal standards for pasteurization which in most instances require that the milk be heated to 145 degrees Fahrenheit for thirty minutes or to 180 degrees or above for at least one minute. This process destroys such disease germs as tuberculosis, typhoid, dysentery, and diphtheria, and also approximately 99% of the bacteria present.¹ As a result, the consumers are protected from diseases transmitted by milk and, in addition, the milk does not sour so quickly. In some cases the milk is pasteurized in the bottles, but in most cases it is pasteurized in tanks. After pasteurization the milk is immediately cooled and then bottled. Many milk distributors operate automatic bottling and capping machines. After bottling, the milk is kept at a temperature of approximately 40 degrees Fahrenheit until it is delivered to the customer.²

Sanitary requirements for milk distributors as well as for producers are stringent. In most states temperature charts from the pasteurizing vats must be kept each day. These charts indicate the temperature of the milk in the vats and the length of time at which the milk is held at the required temperature; usually

¹ Judkins, Henry F., *The Principles of Dairying* (New York, John Wiley & Sons, Inc., 1925), p. 163.

² Mojonier, Timothy, and Troy, Hugh C., *The Technical Control of Dairy Products* (Milwaukee, C. N. Casper Company, 1925), p. 877.

they must be kept on file for inspection. The cleanliness of the equipment and the handling of the milk are also checked regularly by municipal inspectors. In addition, sample quarts of milk are taken from delivery trucks by municipal inspectors and tested for sediment, bacteria, butterfat, and total solids.

PROCESSING OF OTHER MILK PRODUCTS

Butter making is now largely a factory operation. The production of farm butter has been declining since 1899, although as late as 1919 almost half the butter produced in this country was churned on the farm. In 1934, 559,000,000 pounds of butter were churned on the farms, of which more than 60% was produced in the southern states.¹ Today only a very small quantity of farm butter is manufactured for sale, and this butter is usually sold only in small agricultural communities. The total of butter churned on farms in 1934 was only a third of the total of creamery butter produced in the same year. Exhibit 6 indicates that the Middle Western states are the most important producers of creamery butter.

EXHIBIT 6
PRODUCTION OF CREAMERY BUTTER IN THE UNITED STATES: AVERAGE,
1929-1933, ANNUAL, 1934-1938
(In thousands of pounds)

State	Average, 1929-1933	1934	1935	1936	1937*	1938
Minnesota.....	286,278	275,786	272,585	289,830	274,468	296,208
Iowa.....	221,741	238,313	217,810	208,926	199,675	230,285
Wisconsin.....	166,855	161,942	159,908	171,400	177,756	188,345
Nebraska.....	89,568	91,384	76,400	72,842	64,129	73,389
Missouri.....	81,544	84,747	87,438	74,214	80,877	95,524
Ohio.....	81,057	80,997	82,640	79,256	76,703	81,908
Michigan.....	72,640	76,438	77,439	82,162	81,023	88,774
Kansas.....	68,288	79,248	69,548	62,802	68,119	78,680
Illinois.....	68,076	71,927	71,360	67,640	66,783	76,645
California.....	73,973	70,760	64,377	63,617	65,644	66,933
Other states.....	454,033	463,166	452,875	456,718	462,161	498,808
Total United States..	1,664,053	1,694,708	1,632,380	1,629,407	1,617,338	1,775,499

* In a few cases monthly figures given in *Crops and Markets* are preliminary or estimated rather than final.

Source: For 1929-1936: U. S. Department of Agriculture, *Agricultural Statistics*, 1937 (Washington, Government Printing Office, 1937), Table 422, p. 309, and *ibid.*, 1938, Table 491, p. 354. For 1937 and 1938: U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 3, March, 1938; Vol. 16, No. 2, February, 1939 (Washington, Government Printing Office).

The production of one pound of butter requires 21 pounds or $2\frac{1}{2}$ gallons of whole milk. Since the milk remaining after the

¹ U. S. Bureau of the Census, *Census of Agriculture: 1935*, *op. cit.*, p. 264.

cream has been separated and drawn off is of little value to the creamery, the separation usually is done on the farm, where the producer can feed the skimmed milk to the livestock. The cream is then transported to the creamery, where it is tested and weighed. Since the cream generally arrives in varying degrees of sourness, the acidity is reduced by lime and magnesium or soda neutralizers. In many creameries the cream is pasteurized in a manner precisely the same as that employed in the pasteurization of fluid milk.

The cream is then "ripened" either naturally or artificially. This process produces the typical flavor, aroma, and texture of butter, and also affects the churning and keeping qualities of the butter. Natural ripening consists of permitting the cream to sour by holding it at a temperature favorable to bacterial action. This process does not permit close control of the souring process, and as a consequence the method of ripening most frequently used is artificial ripening by the introduction of a "starter." An artificial starter consists of milk of one sort or another which has been fermented by a selected culture of lactic acid bacteria. By this means the ripening process can be completed within three or four hours, or overnight at the most.

The cream is then cooled to approximately 50 degrees Fahrenheit, and churned for about forty-five minutes, after which the buttermilk is drawn off and the butter washed with an amount of water equivalent to that drawn off in buttermilk. The butter is salted, worked in order to distribute the salt and squeeze out excess moisture, and then packed into tubs or cut into blocks of a pound or less, and wrapped. In the early spring, the butter moves directly into consumption, but from June until September large quantities are put into cold storage to be withdrawn between November and March.

By far the most important cheese-producing state in this country, Wisconsin, accounts for approximately two-thirds of the nation's total production and for ten times as much as New York, the second largest producing state. As is true of butter in the creameries, the production of cheese usually follows the seasonal swings of milk production, increasing in the early spring and declining in the winter months to a third of the summer production. The manufacture of cheese, however, requires a fresh daily supply of milk.

Cheese making is essentially a village industry and takes place in small establishments. In a study of 182 cheese factories in Wisconsin it was discovered that approximately 80% had fewer than 35 regular patrons and that a similar proportion owned buildings valued at less than \$5,000 and equipment valued at less than \$2,500.¹

Most of the condenseries for processing milk are owned by the large companies selling a branded milk product in cans. These companies own chains of condenseries located in the dairy sections where fresh milk is available daily. There are also some independent condenseries and some condenseries operated by the larger cooperatives as an outlet for the production of their members. There are two general types of canned milk, evaporated and condensed. In the evaporated milk 60% of the water in the milk is evaporated and the remainder is canned as a thick fluid. Condensed milk in cans is a concentrated evaporated milk to which cane sugar is added in order to preserve the milk.

The production of ice cream is scattered and seasonal, and utilizes only 3% of the annual production of milk. It varies in size of operations to include the large distributor who sells ice cream "mix," that is, the combination of milk, cream, eggs, and gelatin; other "ice cream manufacturers" who add the flavors; and the small retail establishment which manufactures its own ice cream. Dried or powdered milk, malted milk, and casein use less than one-tenth of 1% of the total milk production of the country. Casein is used principally in the paper industry for paper coating. The utilization of milk in the various types of manufactured dairy products is shown in Exhibit 7.

MARKETING OF FLUID MILK

The various agencies which market fluid milk may be divided into six general classifications: (1) producer-distributors; (2) retail distributors; (3) grocery stores; (4) wholesale distributors; (5) jobbing companies; and (6) cooperatives.

The producer-distributors are usually confined to small towns adjacent to rural areas. To satisfy the needs of their customers, these distributors frequently have to supplement their own supply by buying milk from neighboring farms.

¹ Wisconsin Agricultural Experiment Station, Research Bulletin No. 100, *American Cheese Factories in Wisconsin*, by Henry H. Bakken (Madison, August, 1930), pp. 8-10.

EXHIBIT 7
ESTIMATED QUANTITIES OF MILK UTILIZED ANNUALLY IN
MANUFACTURED DAIRY PRODUCTS, 1929-1936
(In millions of pounds)

Milk Product	1929	1930	1931	1932	1933	1934	1935	1936
Creamery butter*.....	32,175	32,162	33,557	34,046	35,431	34,018	32,665	32,647
Cheese†.....	4,894	5,061	4,975	4,883	5,469	5,826	6,238	6,446
Evaporated milk‡.....	3,223	3,113	3,072	3,377	3,694	3,677	3,947	4,385
Condensed milk‡.....	805	715	581	482	421	454	447	528
Factory ice cream§.....	3,046	2,880	2,479	1,840	1,751	2,103	2,343	2,875
Dry or powdered whole milk..	101	118	96	91	97	121	156	137
Dry or powdered cream.....	6	8	3	1	3	1	1	3
Malted milk.....	61	60	51	35	33	36	41	50
Total.....	44,311	44,117	44,814	44,755	46,899	46,236	45,838	47,071

* Does not include farm butter or milk equivalent of whey butter.

† Excluding cottage, pot, and bakers' cheese.

‡ Excluding product made from skimmed milk.

§ Excluding milk equivalent of butter or concentrated milk used as sources of fat in ice cream.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 412, p. 303; *ibid.*, 1938, Table 481, p. 349.

The retail distributor is the type generally found in large cities. This type of distributor buys fluid milk at country points, pasteurizes and bottles it in his city plant, and delivers the milk by wagon or truck to the consumer's doorstep. Some cooperatives also sell milk and cream at retail.¹ Frequently a large distributor also does a wholesale business in bulk milk and cream, and manufactures butter and ice cream as well. The smaller distributor does not manufacture butter or ice cream but frequently sells butter and eggs to his customers.

Another type of retail distributor is called the intermediate dealer, subdealer, distributing broker, or "bobtailer." Such a dealer is usually an individual with previous experience in the milk distributing business who has started his own milk route with supplies purchased from a local pasteurizing or bottling concern.

Practically all grocery stores in larger cities, both independent and chain, sell milk and cream, generally for less than the wagon-delivered price. Such stores usually require a deposit which is held until the bottle is returned. During the general business depression of 1929-1933 other forms of "over-the-counter" outlets such as cut-rate milk depots and roadside stands increased in importance as retail distributors.

Wholesale distributors purchase from producers or country plants in order to supply milk and cream to institutions such as

¹ See p. 43.

hotels,¹ restaurants, hospitals, stores, or possibly to small retail distributors, but the wholesale distributors do not sell at retail. Large retail distributors also frequently sell at wholesale, however. In the total distribution of milk, the wholesaler does not play a very large part. There are a few wholesale dealers in New York City and in other large metropolitan milk centers.

Jobbing companies usually deal largely in surplus fluid milk and cream, supplying markets where a temporary shortage exists, or supplying distributors who do not have an adequate supply of milk throughout the year. This type of distributor is more important where a large proportion of the market's cream requirements comes from outside the regular milkshed,² and distributors must buy cream from distant sources in the months of low production. In the general market picture, however, the jobber is relatively unimportant.

The cooperatives³ are engaged in marketing in a variety of ways. In addition to manufacturing dairy products, they retail milk and cream, distribute other dairy products, and bargain with distributors on payments and prices.

MARKETING OF OTHER DAIRY PRODUCTS

Butter is sold by the creameries to wholesale produce merchants and chain stores which in turn distribute it to consumers through retail outlets. The meat packers market butter, using the same facilities required in the distribution of their meat products. Butter futures contracts are traded in on the Chicago Mercantile Exchange in carload lots of storage butter. The largest proportion of the trading is for November delivery, since this contract opens for trading in January and calls for delivery of butter in the month when it begins to move out of storage because of the reduction in current supplies. Those using the

¹ The amount of fluid milk consumed in hotels and restaurants sometimes represents a rather substantial proportion of the milk consumed in the market. In Pittsburgh, from 13% to 16% of the total fluid milk was sold in hotels and restaurants, and in other Pennsylvania cities the proportion ranged from 8% to 14%. The proportion of cream sales made through these channels was usually higher. Pennsylvania Agricultural Experiment Station, Technical Paper No. 659, *The Consumption of Fluid Milk and Other Dairy Products in Philadelphia, June, 1934* (State College, July, 1934), p. 3.

² A milkshed is the area adjacent to an urban market which normally supplies the market with its requirements of fluid milk.

³ The activities of the cooperatives are described in greater detail on pp. 41-46.

futures market include butter commission merchants, brokers, speculators, and to some extent the large manufacturers of butter.

Cheese is also sold to chains and wholesalers, and a large proportion is sold under brand names. The distribution of cheese is concentrated largely in the hands of Kraft-Phenix, Borden's, and the meat packers. Each Friday afternoon on the Wisconsin Cheese Exchange at Plymouth, Wisconsin, members of the exchange buy and sell cheese to establish the price for the week. Cheese futures contracts are also traded in on the Chicago Mercantile Exchange, where the November contract is the most popular since cheese also is moving out of storage at this time.

CONSUMPTION OF MILK AND OTHER DAIRY PRODUCTS

The consumption of dairy products is relatively steady from year to year, even in periods of business depression, although there is some substitution between products. For example, the per capita consumption of evaporated milk increased during a period of reduced incomes, while the consumption of fluid milk decreased. The per capita consumption of dairy products in recent years is shown in Exhibit 8.

The consumption of fluid milk is relatively steady throughout the year.¹ The seasonal increase in production in the spring is diverted to other uses such as the manufacture of butter, cheese, and other processed products. Although the consumption of fluid milk does not fluctuate widely, since it is consumed as a

¹ In a comparison of consumption in eight major markets the consumption by months varied from 91% of the average monthly consumption for the entire year to 109%. In Boston, however, the range was from 96% to 107%, in New York the variation was between 93.6% in January to 109% in June, while in Chicago the range was much narrower, varying from 96.3% in August to 103.2% in October.

The daily fluctuations in consumption are of relatively the same amplitude, ranging in New York from 90.2% on Sunday to 102.8% on Friday, based on the average daily sales for the week. U. S. Department of Agriculture, AAA, Division of Marketing and Marketing Agreements, Dairy Section, Marketing Information Series, *Some Problems Involved in Establishing Milk Prices*, by E. W. Gaumnitz and O. M. Reed (Washington, Government Printing Office, 1937), Table 19, p. 46.

Holidays and changes in temperature also cause daily variations of some amplitude. In the case of one company in Detroit the high sales on one day were 39% greater than the low sales on one day in the same year. Michigan State College Agricultural Experiment Station, Special Bulletin No. 170, *The Detroit Milk Market*, by J. T. Horner (East Lansing, March, 1928), p. 49. The variations in demand for different types of milk and the fluctuations in sales through different channels are considerably greater. Retail sales of extra heavy cream on Thanksgiving and Christmas were 83% above normal in New York City in 1924. Wholesale sales of milk decreased from 10% to over 32% on various holidays in the same year. Cornell Agricultural Experiment Station, Bulletin 459, *The Demand Side of the New York Milk Market*, by H. A. Ross (Ithaca, July, 1927), pp. 44-47.

food, income is an important factor in determining the per capita consumption of milk. Families with small incomes consume less milk than families with large incomes.¹

EXHIBIT 8
PER CAPITA CONSUMPTION OF DAIRY PRODUCTS IN THE UNITED STATES,
AVERAGE, 1910-1914 AND 1924-1929, ANNUAL, 1930-1937

Year	Butter, total pounds*	Cheese, pounds	Evap- orated milk, case goods, pounds	Con- densed milk, case goods, pounds	Com- mercial ice cream, gallons†	Fluid milk and cream in cities and vil- lages, gallons	All manu- fac- tured dairy prod- ucts (milk equiva- lent), pounds	All dairy prod- ucts (milk equiva- lent), pounds
1910-1914	17.5	4.28	4.58	2.69	0.54	‡	434	‡
1924-1929	17.6	4.60	9.93	1.00	2.02	39.5	467	805
1930	17.3	4.61	11.25	0.80	1.96	40.1	465	815
1931	18.1	4.47	11.50	0.66	1.68	39.0	475	832
1932	18.3	4.37	12.39	0.47	1.24	39.1	474	819
1933	17.9	4.49	12.38	0.42	1.18	38.6	467	797
1934	18.3	4.84	13.49	0.40	1.42	36.1	483	816
1935	17.3	5.24	14.64	0.39	1.56	37.0	472	804
1936	16.6	5.35	14.10	0.36	1.90	38.2	462	800
1937	16.7	5.32	14.58	0.34	2.01	‡	464	‡

* Farm and factory.

† Production.

‡ Not available.

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *The Agricultural Outlook*, 1939 (preliminary), "The Dairy Outlook for 1939" (Washington, November, 1938), p. 7.

There is also some variation in the consumption of fluid milk, depending on the type of distribution. One study indicates that the per capita consumption is higher where the percentage of sales made through retail stores is large.² The inference is that the lower prices charged per bottle in the retail stores as compared with the prices for wagon-delivered milk resulted in a more than proportionate increase in consumption, indicating that the demand

¹ U. S. Department of Agriculture, AAA, Consumers' Counsel Division, Publication No. 2, *A Survey of Milk Consumption in the 59 Cities in the United States* (Washington, June, 1936), pp. 13-19.

² University of Illinois, Agricultural Experiment Station, Bulletin 397, *Prices and Consumption of Milk in Specific Cities*, by R. W. Bartlett (Urbana, January, 1934), pp. 444-448.

for milk could be considered elastic. Most authorities agree, however, that the demand for milk is inelastic,¹ although some others have introduced evidence to indicate that the demand is not rigid.²

Consumption of fluid milk varies in different sections of the country and between racial groups. The per capita consumption is lower in the South and Southeast than it is in the Northeast, Middle West, and West. Negroes and Italians consume much less milk and cream per capita than most other groups. The native whites, Irish, and Germans consume more per capita of all dairy products, although Jewish people consume more cream than those of Irish or German extraction.³ Farm families, of course, consume more milk than urban families, and families with children consume more per capita than families without children.

As indicated in Exhibit 1, more than 40% of the total milk produced in this country is used in the manufacture of butter. Although the butter consumed per capita averages only 16 to 18 pounds annually as compared with the 14 pounds of evaporated milk per capita, the amount of whole milk equivalent is substantially larger for butter, since 21 pounds of milk are required to produce 1 pound of butter and only 2.25 pounds of milk are required to produce 1 pound of evaporated milk.

The size of family income directly affects the per capita consumption of butter. This factor is important because of the tendency to substitute oleomargarine for butter when family incomes are low or when the price of butter rises.⁴ Consumption of butter varies also by race: the native whites, Jews, and families

¹ U. S. Department of Agriculture, Technical Bulletin, No. 73, *Some Factors Affecting the Demand for Milk and Cream in the Metropolitan Area of New York*, by H. A. Ross (Washington, Government Printing Office, 1928), p. 46. Ross, in this study of demand in the New York area, stated that a 10% change in price resulted in only a 2% change in the volume consumed. This conclusion covered the five weeks following the price change, and it was Ross' opinion that the percentage change in volume was less after this period.

See also U. S. Department of Agriculture, AAA, Dairy Section, Paper No. 12, Series on Marketing Agreements and Orders, *Economic Brief with Respect to the Proposed Amendment to Order No. 4 for the Greater Boston, Mass., Marketing Area* (Mimeographed, 1937), p. 48; Cassels, J. M., *A Study of Fluid Milk Prices* (Cambridge, Harvard University Press, 1937), pp. 41-44; and U. S. Department of Agriculture, AAA, Dairy Section, *Some Problems Involved in Establishing Milk Prices*, by E. W. Gaumnitz and O. M. Reed (Washington, Government Printing Office, 1937), p. 44.

² U. S. Department of Agriculture, Consumers' Counsel Division, Publication No. 2, pp. 14-15.

³ Cassels, *op. cit.*, p. 89.

⁴ *Ibid.*

of northern European origin consume more butter than Negroes and families of southern European origin.¹

The per capita consumption of cheese in the United States, which varies between 4 and 5 pounds, is much lower than in European countries such as Switzerland, where the per capita consumption is 24 pounds annually; Italy, where it is 12 pounds annually; and Great Britain and Germany, where it averages 10 pounds annually.² The distinctive types of cheese produced in these countries, many of which have been imitated in the United States, still result in our importing a greater amount of cheese than of any other dairy product.³

The per capita consumption of evaporated milk has increased from 7.5 quarts of whole milk equivalent in 1920 to 15.7 quarts in 1934. During the same period the per capita consumption of milk and cream increased from 152.4 quarts in 1921 to 163.2 quarts in 1929, and then declined to 144.4 quarts in 1934. The principal cause for this relative and actual increase in the consumption of evaporated milk was the economic situation, which encouraged the use of low-cost foods. Distribution of evaporated milk by the Federal and state governments to people on relief was also a contributing cause.⁴ Although evaporated milk is not bought entirely on a price basis, larger quantities per capita are consumed in families of low weekly income.⁵

Because of its sweet flavor, condensed milk is not in direct competition with fluid milk and its per capita consumption has been declining in recent years. The greatest demand for ice cream comes during the summer months, of course, coincident with the best season for milk production.

OLEOMARGARINE

Oleomargarine, a butter substitute, usually sells at retail for approximately half the price of butter. Substitution of oleomargarine for butter increases rapidly when the price of butter

¹ Pennsylvania Agricultural Experiment Station, Technical Paper No. 659, p. 251.

² Renne, R. R., *The Tariff on Dairy Products* (Madison, Tariff Research Committee, 1933), p. 102.

³ See Exhibit 10.

⁴ Brown, Edward F., *The Effect of Evaporated Milk Consumption on Fluid Milk Sales in the United States, 1935* (New York, Milk Research Council, Inc., 1935), p. 10.

⁵ U. S. Department of Agriculture, Consumers' Counsel Division, Publication No. 2, p. 17; and Pennsylvania Agricultural Experiment Station, Technical Bulletin No. 659, p. 23.

risers above 35 cents a pound.¹ The consumption of oleomargarine is still small compared with that of butter, averaging between 2 and 3 pounds per capita during the period 1920 to 1935, while butter consumption averaged 17 pounds per capita during the same period. Two companies are responsible for most of the oleomargarine produced in this country: Best Foods, Inc. (a subsidiary of General Foods, Inc.), producer of Nucoa, and the Jelke Company, producer of the Good Luck brand.

The dairy interests have always opposed the increase in production of oleomargarine and were the principal supporters of the tariff on vegetable oils and the 10-cent per pound tax which is assessed on all colored oleomargarine sold in this country. The tax on uncolored is one-quarter of a cent per pound, and as a consequence 99% of the oleomargarine is sold in this form. A package of coloring is included in the container when the product is sold at retail, and the consumer colors the oleomargarine to suit his own preference.

The important items used in the production of oleomargarine and their percentage of the total weight of oleomargarine produced in the United States in 1936 were as follows: coconut oil, 46%; cottonseed oil, 33%; oleo oil, 6%; babassu oil, 5%; soybean oil, 4%; peanut oil, 1%; neutral lard, 1%; oleostearin, 1%; oleostock, 1%; and other fats and oils, 2%.² The use of cottonseed oil has increased from 9% in 1933 to 33% in 1936, while the proportion of coconut oil decreased from 75% to 46%, principally because of the tariff.

DAIRY COOPERATIVES

Dairy farmers were the first to attempt collective action in marketing,³ and cooperatives have been operated on a more widespread scale in the dairy industry than in any other agricultural industry. As may be seen in Exhibit 9, in number of members and in dollar volume of dairy products handled, the dairy cooperatives exceed those of any other type. In each major market successful cooperatives control a large proportion of the flow of milk to the market. From 70% to 90% of the fluid milk sold to

¹ Black, John D., *The Dairy Industry and the AAA* (Washington, The Brookings Institution, 1935), p. 38.

² U. S. Department of Agriculture, *Agricultural Statistics, 1937, op. cit.*, Table 443, p. 323.

³ Bakken, H. H., and Schaars, M. A., *The Economics of Cooperative Marketing* (New York, McGraw-Hill Book Co., Inc., 1937), p. 51.

EXHIBIT 9
FARMERS' MARKETING AND PURCHASING ASSOCIATIONS: NUMBER,
ESTIMATED MEMBERSHIP, AND ESTIMATED BUSINESS, WITH
PERCENTAGES, BY SPECIFIED GROUPS
1937-1938 MARKETING SEASON

Products covered	Associations listed*		Estimated members†		Estimated business‡§	
	Num-ber	Per-cent	Number	Per-cent	Thou-sands of dollars	Per-cent
Marketing:						
Cotton and products.....	415	3.8	350,000	10.3	110,000	4.6||
Dairy products.....	2,421	22.2	700,000	20.6	686,000	28.6
Fruits, vegetables, nuts. ...	1,216	11.2	179,800	5.3	315,800	13.1
Grain, dry beans, rice.....	2,619	24.0	360,000	10.0	475,000	19.8
Livestock.....	926	8.5	600,000	17.0	312,000	13.0
Poultry and products... ..	194	1.8	106,000	3.1	91,000	3.8
Tobacco.....	11	.1	70,000	2.0	13,000	.5
Wool and mohair.....	130	1.2	50,000	1.5	11,300	.5
Miscellaneous¶.....	368	3.4	84,200	2.5	35,900	1.5
Total marketing.....	8,300	76.2	2,500,000	73.5	2,050,000	85.4
Purchasing.....	2,600	23.8	900,000	26.5	350,000	14.6
Total marketing and pur- chasing.....	10,900	100.0	3,400,000	100.0	2,400,000	100.0

* Includes independent local associations, federations, large-scale centralized associations, sales agencies, and independent service-rendering associations, and also subsidiaries whose business is distinct from that of the parent organizations.

† Includes members, contract members and shareholders, but does not include patrons not in these categories.

‡ Includes some intra-association transactions.

§ The purchasing business of the marketing associations is estimated at \$117,000,000, and the marketing business of the purchasing associations is estimated at \$27,000,000. After adjustments the totals are: marketing, \$1,960,000,000; purchasing, \$440,000,000; total, \$2,400,000,000.

| Includes some government loan cotton.

¶ Includes associations handling commodities not specified above, those handling several types of commodities, and those furnishing special marketing or other services.

Source: U. S. Farm Credit Administration, Cooperative Research and Service Division, Miscellaneous Report No. 18, *Statistics of Farmers' Marketing and Purchasing Cooperatives, 1937-38 Marketing Season*, by R. H. Elsworth (Washington, February, 1939), p. 7.

distributors in Chicago, Philadelphia, Boston, Baltimore, Wash-
ington, Detroit, and the Twin Cities is furnished by members of
the principal producers' cooperatives in those markets. In
New York, St. Louis, and Kansas City the proportion averages
about 50%.¹

Cooperatives in the dairy industry include those marketing
fluid milk and those manufacturing dairy products such as butter
and cheese from surplus milk. The distinction between these

¹ Black, *op. cit.*, p. 48.

types is not clear-cut since some cooperatives engage in both activities.

Cooperative associations marketing fluid milk may be classified in three groups: (1) bargaining associations; (2) operating associations; and (3) marketing associations.

A bargaining association has no facilities for handling milk and does not take title to the milk, but negotiates with distributors concerning prices, terms of sale, and standard deductions for transportation charges. It may also perform milk testing to check the tests of the buyer concerning the quality of the milk, and it may sometimes guarantee payments to its member producers. Until recent years many cooperatives were of this type, and the members sold all their milk, including surplus milk, to the distributor. An example of this type of cooperative is the Interstate Milk Producers Association, which is the only important cooperative in the Philadelphia market. The membership of this cooperative includes approximately 75% of the milk producers in the Philadelphia milkshed, who produce 80% of the milk in this area.¹

The operating associations perform the same functions as the bargaining associations and, in addition, operate plants for the processing of surplus milk. These associations take title to the milk, sell to the distributors the amount of milk required for consumption as fluid milk, and process the balance. The Twin City Milk Producers Association of St. Paul, Minnesota, is an example of this type of cooperative. This association in 1936 owned 13 plants in which its surplus milk was processed into 14 different dairy products.

The marketing associations are, in addition to their other functions, engaged in the distribution of milk directly to the consumers. One of the most important cooperatives of this type is the Cooperative Pure Milk Association, which operates the largest milk distributing business in Cincinnati. After some disputes between the cooperative and the distributors,² this coopera-

¹ U. S. Federal Trade Commission, *Sale and Distribution of Milk Products, Connecticut and Philadelphia Milksheds*, House Document No. 152, Seventy-fourth Congress, First Session (Washington, Government Printing Office, 1935), pp. 8-10.

² U. S. Federal Trade Commission, *Distribution and Sale of Milk and Milk Products, Boston, Baltimore, Cincinnati, St. Louis*, House Document No. 501, Seventy-fourth Congress, Second Session (Washington, Government Printing Office, 1936), p. 65.

tive purchased in 1924 the French Bros.-Bauer Company, which was then the largest milk distributing company in Cincinnati. The largest bargaining cooperative, the Dairymen's League Cooperative Association of New York City, also distributes some of its fluid milk at retail.¹ There are other cooperatives which combine some of the functions described; for example, the Maryland and Virginia Milk Producers Association, Inc., of Washington, D. C., takes title to the milk but owns no processing facilities. Distributors separate all the surplus milk into cream for this cooperative; then the cream is returned to the cooperative for sale in the most lucrative market.²

In addition to the cooperative associations marketing fluid milk there are also dairy cooperatives manufacturing and selling dairy products such as butter, cheese, and condensed and evaporated milk. Included in this latter category are the cooperative cheese factories, the local cooperative creameries, and the large-scale regional organizations which market the products of a group of local cooperatives manufacturing dairy products.

The majority of the cooperative cheese factories are located in Wisconsin since production is concentrated in that state. A federation of these cooperatives was organized in Plymouth, Wisconsin, in 1913 and is now known as the Wisconsin Cheese Producers Cooperative.³ In 1934 the federation became a member of the Land O'Lakes Creameries, a large cooperative distributor of dairy products, and cheese produced by the member cooperatives is now marketed through this latter organization.

The local cooperative creameries are of greatest importance in the surplus producing areas. In Iowa, for example, there were in 1935 a total of 277 cooperative creameries in operation. These creameries accounted for 56% of the total production of creamery butter in Iowa.⁴ Of these cooperatives which were formed originally as outlets for the milk produced in those areas, many failed. Others have continued to operate successfully. Many of these creameries are putting emphasis on the aggressive mer-

¹ U. S. Farm Credit Administration, Bulletin No. 3, *Cooperative Marketing of Agricultural Products*, by Ward W. Fetrow (Washington, Government Printing Office, 1936), p. 32. This cooperative also operates condenseries and butter and cheese factories.

² *Ibid.*

³ U. S. Farm Credit Administration, Bulletin No. 3, pp. 23-24.

⁴ U. S. Farm Credit Administration, Bulletin No. 14, p. 1.

chandising of their products and on the efficient and economic operation of their plants.

Some cooperatives are now organized into federations which market dairy products over a wide area. The largest of these is the Land O'Lakes Creameries, Inc., of Minneapolis, which sells annually a total of approximately 90,000,000 pounds of butter under its own trade-mark.¹ The association also sells cream, cheese, cascin, milk powder, and poultry products. Another large organization of a similar type formed by California cooperative creameries is the Challenge Cream and Butter Association of Los Angeles, which annually handles for its members approximately 30,000,000 pounds of butter in addition to other dairy products.²

The success of the dairy cooperatives can be attributed in part to the fact that the price of the most important product, fluid milk, is set in a local market where the bargaining power of the cooperative is pitted against a relatively small group of purchasers. In addition, the use of the milk determines the price to a greater extent than in other commodities, and a single farmer is helpless if the distributor to whom he sells pays a surplus price rather than a fluid milk price. As a result this farmer joins a cooperative principally to insure equality of bargaining power in dealing with distributors. In some cases, the profits of the distributor or the processor were attractive, and farmers' cooperatives engaged in these activities to return the profits to the farmers. In addition to protecting the farmers' interests, there was also the hope that something approaching a monopoly price could be charged distributors when the membership in the cooperative was large enough to force high prices on the distributors. Needless to say, those cooperatives emphasizing monopoly prices have not been successful.

The cooperatives manufacturing or processing dairy products were formed principally as a defensive measure to insure an outlet for surplus milk. A cheese plant or creamery requires only a modest investment, secures its supply from a limited area, and, all in all, is essentially a community or cooperative project.

The justification and need for cooperatives decrease in the areas which are not suited for dairy farming and outside the milk-

¹ U. S. Farm Credit Administration, Bulletin No. 3, p. 26.

² *Ibid.*, p. 27.

sheds of the large cities. In these areas milk is frequently distributed by the producer or consumed at home. As a consequence, the problems of price and usage are diminished.

As in most cooperatives, the chief problems are of a business nature. The efficient operation of the organization depends upon the clear understanding, by all members, of the fact that a cooperative performs a definite function in the marketing of the products and is in competition with other organizations performing similar services. This understanding is essential in the determination of efficient operating policies, since the attitude of the members obviously is reflected in the action of the management. Many dairy cooperatives are efficient business units and, as such, have had successful records, while others, looking for monopoly prices or middleman's profit exclusively, have failed, because of inability to obtain and hold monopolistic control.

FLUID MILK PRICES

As pointed out above, producers of fluid milk have felt very strongly the need for collective action in bargaining with distributors about the price of milk. In a survey of cooperatives in Ohio, 75% of the members giving their opinions stated that the securing of better prices for their milk was an important benefit secured through their cooperatives.¹ It should be noted, however, that most of the cooperatives investigated in this study were strictly of the bargaining type.

The producers of milk first began to make their demands known in an emphatic fashion when a milk strike was called in 1916 by the producers in the Chicago milkshed. Strikes were also called in New York, Boston, Pittsburgh, and Cincinnati. The effect of these strikes was temporary as far as prices were concerned, but public attention was focused on the problem, producers were brought together, and cooperative associations were strengthened.²

One problem which affects the negotiations between distributors and producers is the fact that retail prices do not always reflect such negotiations. Since the retail price is quoted in

¹ U. S. Farm Credit Administration, Bulletin No. 16, *Milk Cooperatives in Four Ohio Markets*, by William C. Welden and T. G. Stitts (Washington, Government Printing Office, 1937), p. 29.

² U. S. Department of Agriculture, Technical Bulletin No. 179, *Cooperative Marketing of Fluid Milk*, by Hutzler Metzger (Washington, Government Printing Office, 1930), pp. 11-12.

cents a quart, a large percentage change in price is required to raise or lower the price by 1 cent a quart. The distributor-producer negotiations are based on the price for a hundredweight of milk, which gives greater opportunity for small price changes.¹

The large spread of the distributor also disturbs the farmer. In 1934 the retail price of a quart of milk averaged 12.02 cents, according to reports of eight large companies.² Of this amount, the distributors paid producers, including transportation costs, an average of 5.95 cents per quart, and the distributors' gross margin was 6.07 cents, or slightly over half the retail price. Needless to say, such a gross margin looms large in the eyes of the farmers and they fail to see why they should not receive a larger proportion of the retail price.

Another characteristic which creates an unstable and unsatisfactory price situation is the fact that apparently both the supply and the demand for milk are relatively inelastic. As pointed out above, the supply of milk varies substantially by seasons without regard to changes in the retail price, because of the increased production from green pasturage and from freshening of the cows. Some change in the volume of milk produced can be effected by regulating the type and amount of feeds. For any substantial increase, however, it is necessary to have more cows, and the time required to increase a dairy herd by breeding is at least two years. A further factor which minimizes the effect of price on supply is the fact that fluid milk is frequently a by-product of other farming activities and is produced regardless of price. The relatively steady demand for milk, which appears to be inelastic, together with the varying supply, results in considerable disagreement between producer and distributor concerning the price to be paid at a particular time.

An additional complication in the milk price situation is the differential in prices for milk to be used for different purposes. The fluid milk destined for human consumption, frequently called class I milk, brings a higher price because of the sanitary requirements which must be met by the producer and because a premium

¹ There are $46\frac{1}{2}$ quarts in each hundredweight of milk (one quart of milk weighs 2.15 pounds). A change of $46\frac{1}{2}$ cents (which would usually mean a percentage change of 25% to $33\frac{1}{3}$ %) in the price for a hundredweight is required to effect a change of 1 cent a quart in the retail price.

² U. S. Federal Trade Commission, *Agricultural Income Inquiry*, Part I, Principal Farm Products (Washington, Government Printing Office, 1938), pp. 113-115.

is paid for freshness. Surplus milk, sometimes called class II,¹ brings a lower price, since this milk is used in the manufacture of dairy products and since a large quantity of milk is produced in excess of the requirements for fluid milk consumption. In addition to the regional and seasonal surplus, there must always be a surplus in the hands of distributors, usually amounting to approximately 10% of the total volume, to protect them from variations in day-to-day consumption. Transportation costs for fluid milk are obviously greater than for the cream or butter equivalent of the same amount of milk. As a result, distant producers can find an outlet for their products in the form of cream or butter when they cannot compete for the fluid milk market.

Since the price for milk to be used in fluid form is usually higher, each dairyman is eager to have all his milk sold for this use and to be paid the higher price. If he has gone to some expense to meet the sanitary requirements and has installed the necessary facilities for handling the milk, he is reluctant to accept the lower price for milk to be used in the manufacture of dairy products, even when seasonal variations produce an excess of fluid milk.

Some of the technical aspects of the dairy industry also affect the pricing situation. Obviously a distributor will pay more for milk with a smaller amount of foreign matter and sediment or a higher butterfat content.² The distributor usually makes these tests in his own plant to assure himself of the exact quality. The formulas for payment on the basis of these variable qualities complicate the pricing structure further.

The negotiations as to price are usually carried on between a distributor and the producers' cooperative. While these two groups can agree on a pricing schedule, it can easily be upset by an agreement between some other distributor who sells fluid milk exclusively and farmers who prefer to sell where they can get a price better than the agreed price. It is difficult to find a market

¹ Classifications vary between markets. In some, class I is fluid milk, class II milk for cream, and class III, other uses. In other markets, milk for butter, ice cream, malted milk, and other uses is placed in separate classes.

² Over a period of fifteen years in the Boston market, the allowance for each one-tenth of 1% butterfat a hundredweight over the base butterfat content ranged from 2.2 cents to 4.8 cents. The base percentage of butterfat in 100 pounds of milk from which this differential was calculated was 3.7%. U. S. Department of Agriculture, AAA, Dairy Section, Series on Marketing Agreements and Orders, Paper No. 12, p. 59.

where the representatives of the distributors negotiating price agreements constitute 100% of the market and where all the farmers are members of the cooperative and are bound by its agreements. One distributor and a few farmers outside this group can upset the entire price structure.

These difficulties in establishing prices for milk have led to the formation of a number of different plans whereby a "fair price" can be assured to both producer and consumer. These plans can be classified under four headings: (1) the classification or use plan; (2) the base-surplus plan; (3) the combination plan; and (4) the flat-price plan. Most of these plans have evolved from negotiations between producer, cooperative, and distributor, and there have been frequent shifts from one plan to another as conditions in the market varied.

The *classification* or *use plan* is sometimes called the class-price plan. It operates on the principle that the price paid the producer for his milk depends on the price received for its use, whether for fluid milk, cream, butter, or processed products. The prices received by the producers are averages of the prices paid for milk used for different purposes, weighted by the actual quantities of milk sold for these purposes during the period. One disadvantage of such a plan is that it offers a temptation to the distributors to adjust actual consumption data, and that it causes trouble because producers are certain to accuse distributors of changing figures, whether they do or not. Another disadvantage is that it allows nonparticipating dealers to engage in profitable price cutting. The operation of this plan may be clarified by an example. Assume that a distributor sells 700 hundredweight of fluid milk and 300 hundredweight of milk for surplus uses when the price of fluid milk is \$2 a hundredweight and surplus milk is \$1 a hundredweight. The producers selling to this distributor would receive a composite price of \$1.70 a hundredweight.¹ Another distributor who could sell all his milk as fluid milk could afford to pay the producers \$1.80 or \$1.90 per hundredweight and still be in a better competitive position than the first distributor, who would pay \$2 a hundredweight for his *fluid* milk, although he would be paying less a hundredweight for the total amount of milk.

¹ Seven hundred pounds of fluid milk at \$2 a hundredweight or a total of \$14, and 300 pounds of surplus milk at \$1 a hundredweight would equal \$3, or a total of \$17 for the 1,000 pounds of milk which yields an average of \$1.70 a hundredweight.

Such a plan was introduced in the Boston market by the Federal Food Commission in 1917. Distributors were required to pay a designated price a quart delivered at the market for all milk sold as fluid milk. The price each producer received for his milk depended entirely on the market outlets of the distributor to whom the milk was sold. The commission required sworn statements as to utilization of the milk received by distributors.¹ This plan was continued until 1930, when it was changed to a combination plan in an attempt to even out the variations in production.

Another type of classification plan is that which is based on the use of the milk for the entire market rather than the use of the milk of an individual distributor. Under this plan all producers delivering in a particular market would receive the same price. If this average price was \$1.65 a hundredweight, a distributor disposing of a large percentage of surplus milk at an average price (under the plan given above) of \$1.50 would be at a disadvantage, and the distributor selling a large percentage of fluid milk would have a definite advantage. In other words, the distributor selling a large percentage of fluid milk would be receiving a higher average price for his sales than would the distributor selling a large percentage of surplus milk, and both would be paying the same price a hundredweight for all their milk. To prevent these differences an equalization plan is usually included in this price plan. With such an equalization or adjustment pool, the distributor who uses a large amount of fluid milk would pay a composite price of, say, \$1.80, and would turn over 15 cents a hundredweight to the equalization pool, and the distributor whose composite price is \$1.50 would receive 15 cents a hundredweight from the pool. It is obvious that to be effective such a plan requires 100% cooperation from both distributors and producers.

The principle of the *base-surplus* or *base-rating plan* is that each individual producer should be made to bear the consequences, in the form of a reduced price, for his own excess or surplus production. Each producer is given a rating which represents his share of the higher priced fluid milk sales. This rating, or base, is usually calculated from the amount produced during

¹ U. S. Federal Trade Commission, *Distribution and Sale of Milk and Milk Products*, House Document No. 501, Seventy-fourth Congress, Second Session (Washington, Government Printing Office, 1936), p. 33.

the months of lowest volume, usually October, November, and December. Production above this figure is paid for on the basis of the lower price received for milk diverted to less remunerative uses. This plan is usually modified and calculated to fit the needs of the local market. The disadvantages of such a plan are that it is difficult to select a proper "base" satisfactory to all concerned; and that there is an almost inevitable tendency to stimulate expansion of production in the base period in order to secure the increased returns which result from a higher base rating.¹

This latter disadvantage was noticeable after the base-surplus plan was introduced in the Baltimore market in 1919. Production was stimulated during the base period to such an extent that the Baltimore market was flooded with milk during the base months in 1923, when normally the supply of milk should have been comparatively small. After the large increase in the base months in 1923, the quotas were calculated on the 1922 production, which was much lower. Consequently, production decreased and quotas were raised. An increase in production followed, and quotas were then calculated on the basis of the average for the base months in 1921, 1922, and 1923. The policy of keeping total base quotas in line with total fluid sales has been followed since that time.²

The *combination plan* is an attempt to eliminate the disadvantages of both preceding plans and to fit the needs of a particular market. Under such a plan, milk is paid for on the basis of its use, but a producer is paid more for uniform production than for fluctuating production.

As mentioned above, the classification or use plan introduced in the Boston market finally evolved in 1930 into a combination plan, designed to encourage more even production. Each producer received a base equal to his average production in 1929 for the months of October, November, and December, these months being the period of the year when production is at its lowest ebb. Producers exceeding this base were paid only the surplus price for the excess milk, although they were paid a composite price

¹ For example, a producer who knows that his year's payments will be based on the amount of his production in October, November, and December will arrange to have his cows freshen during that period and at the same time will give them more milk-producing feeds.

² U. S. Federal Trade Commission, *Distribution and Sale of Milk and Milk Products*, House Document No. 501, Seventy-fourth Congress, Second Session (Washington, Government Printing Office, 1936), pp. 52-55.

for their base milk. The composite price represented the combined price of fluid milk and milk used for other purposes.¹ Since surplus production was paid for only at surplus prices, producers were encouraged to keep their production as close as possible to their base ratings.

This plan also included the equalization fund whereby all distributors paid the same price for milk based on the use to which the milk was put in the entire market. Under this plan the distributor paid the producer the fixed price for milk and, in addition, paid a differential to the equalization fund if the proportion of his fluid milk sales was above the market average. Conversely, the distributor with a small proportion of fluid milk sales received from the fund an amount representing the differential between the fixed price and the price based on that distributor's individual use.²

The *flat-price plan* is a straight transaction whereby the producer is paid a flat price for all his milk regardless of the use. Such a plan is usually confined to small towns or to small dealers interested in acquiring supplies solely for use as fluid milk, and the

¹ A simple illustration of the payments received by the producer under this combined plan is as follows:

Daily average production during base period.....	200 pounds
Percentage of total production necessary to supply fluid milk requirements for Boston market.....	61%
Base rating.....	122 pounds
Total production for one month.....	6,000
Base rating: 122 pounds a day \times 30 days.....	3,660
Surplus over base rating.....	2,340 pounds

Current fluid milk price \$2 a hundredweight net to producer
 Current surplus milk price \$1 a hundredweight net to producer
 Composite price for base production:

61% at \$2 per 100 =	\$1.22
39% at \$1 per 100 =	.39
Composite price..	\$1.61
3,660 pounds at \$1.61 =	\$58.93
2,340 pounds at \$1.00 =	23.40
Producer's total receipts	\$82.33

² For example, in the illustration given in the footnote above, a distributor with sales of 80% fluid milk and 20% surplus milk would still pay the producer \$1.61 a hundredweight for his base ratings and \$1 a hundredweight for his surplus milk. The distributor then would pay the equalization fund on the basis of his use, that is, since \$1.80 a hundredweight would be his usual price he would pay the fund 19 cents a hundredweight purchased. The price of \$1.80 is derived from the 80% of his sales at \$2 a hundredweight or \$1.60 plus 20% of sales at \$1 a hundredweight or 20 cents.

price varies seasonally with the supply. Some of the larger markets used this plan until a few years ago. Producers supplying the Cincinnati market were paid on a flat-price basis until 1925, and those in the St. Louis market were paid flat prices until 1930.

An increasing number of milk markets have adopted the combination plan, principally because of the base rating applied to each producer. The use of the milk by the individual distributor is the basis for making payments in some markets, and the total market use is the basis in others. The combination plan is popular since it embraces both the theory of even production throughout the year and the classification by use. The plan can be readily adapted to meet the needs peculiar to any market. In practically all cases such a plan was sponsored by a producers' cooperative.¹

The producers in a particular milkshed are concerned over the general level of prices for milk, but they are also very much interested in stability, since many of these producers in a large milkshed depend upon the sale of milk as the principal source of cash income. It is obvious that seasonal variations in supply will cause fluctuations in prices and, as has been pointed out above, that the use of milk will determine in large measure the price to be paid. Any satisfactory plan should, therefore, include some agreement concerning these two principal causes of variations in price.

The combination plan appears to be soundest because it includes a variable depending on use and on surplus production, the twin hazards of milk price agreements. Each milk market is different, however, and it is more important for producers and distributors to agree on a price plan to suit the needs of their own market than it is to propose a perfect model applicable to all cases. It seems clear, however, that a market or equalization pool cannot function without rigid supervision and extensive authority. Where political interests are at work, it seems unwise to extend so much authority to one board or individual, since both producers and distributors can be hampered in their operations under such control. Price can rarely be legislated, and it seems wisest, therefore, to use a dealer-pool and to confine the price

¹ U. S. Department of Agriculture, AAA, Division of Marketing and Marketing Agreements, Dairy Section, Marketing Information Series, *Some Problems Involved in Establishing Milk Prices*, by E. W. Gaumnitz and O. M. Reed (Washington, Government Printing Office, 1937), p. 39.

making to those producers supplying a particular distributor. The majority of successful distributors are those who have the farmers' interest at heart, and are eager to pay as high a price as possible in order to obtain milk which meets their quality standards.

GOVERNMENT CONTROL OF MILK MARKETING

With such an intricate pricing schedule it might be expected that government activity in controlling milk distribution would have appeared years ago. In the 1920's, however, dairy farmers were much less insistent in their demands for government aid and assistance in price-raising schemes than were the cotton and grain farmers. Most of the problems were local and were settled by negotiation between distributors and producer-cooperatives.

Before 1933, government regulation was confined for the most part to municipal or state sanitary requirements. The municipal ordinances relating to milk usually took the form of permits issued by the Board of Health to producers and distributors. These permits, which provided for the proper sanitary protection of milk, could be revoked for violation of any of the provisions. The state laws were similar in their scope, particular emphasis having been laid on sanitary requirements and standards for milk products. The United States Supreme Court, in several decisions, has upheld the constitutionality of municipal and state regulation of intrastate milk.¹

Since the demand for fluid milk is relatively inelastic, and since producers are limited for the most part to local markets, the dairy farmers did not expand their output during the agricultural boom years to the same extent that other farmers raising exportable commodities did. Nor were the dairy farmers so interested in export markets, tariff differentials, and equalization payments as were the other groups. In common with other agricultural commodities, however, the dairy industry suffered from drastically reduced prices and disorganized markets during the downswing of the depression. Dairy products were included in the original Agricultural Adjustment Act, partly as the result of agitation by organized dairy interests to insure their receiving equal treatment with other agricultural groups, but the rank and file of dairy

¹ Tobey, James A., *Legal Aspects of Milk Control* (Chicago, International Association of Milk Dealers, 1936), Chapters II and III.

farmers had little hope of benefiting directly from government activity.¹

The Agricultural Adjustment Administration, however, seemed to offer the authority to enforce pricing agreements, and producers and dealers turned to it for support. A number of milk marketing agreements covering all the important milksheds were drawn up during the summer of 1933. These agreements were not signed as rapidly as they were drawn up, partly because of the administrative difficulties involved in establishing rules and fair trade practices. Furthermore, since there was no real representative of all the producers or distributors, or sometimes even of a majority of them in a particular market, it was difficult to make negotiations. Thus, only 15 marketing agreements were signed between August 1 and December 30, 1933. All the agreements included a license which was imposed automatically upon all distributors supplying the market covered by the agreement. Most of the agreements were modeled after the Chicago marketing agreement, which was the first to be signed.²

The marketing agreements were designed to create price stability in the milk markets and, as in the National Recovery Administration codes, to control the "chisellers." The license was the means by which those responsible for upsetting the market could be kept in line; the license could be revoked in case of any violations, and the violator thereby could be prevented from doing business in that market. The agreements included provisions relating to prices, distributors' margins, store and wagon prices, fair practices in the trade, and health and quality standards.

Plans for carrying out the agreement in regard to the basis of purchase of producers' milk and the equalization of the surplus and fluid milk sale were included, as well as a provision as to the check-off for payment to the producers' association.³ Included in the provisions was a full schedule of resale prices, both wholesale and retail. There were many violations of this provision, however, and vehement opposition came from the chain stores because they were unwilling to have the store price fixed at the same amount or even at a cent lower than the price for wagon-delivered milk.

¹ Black, *op. cit.*, p. 84.

² *Ibid.*, p. 100.

³ Nourse, Edwin G., *Marketing Agreements under the AAA* (Washington, The Brookings Institution, 1935), pp. 206-216.

Because of the complaints that contracting parties did not represent enough of the interests in the market and because of the serious difficulties of enforcement, all marketing agreements had been cancelled by February 1, 1934. Licenses were to remain in force until replaced by new licenses. As of this same date, the Agricultural Adjustment Administration also announced a new policy of abandoning all resale price agreements, and of attempting instead to fix producer prices which would maintain equilibrium between different classes of uses; these prices were to be supported by production adjustment measures. This policy collapsed, however, when the Agricultural Adjustment Administration abandoned its production control program for dairy products in April, 1934.¹ This action was taken after representatives of the Agricultural Adjustment Administration had held 15 regional meetings of producers throughout the country. Considerable opposition to production control and processing taxes had been evident at these meetings.²

A change in personnel in the Dairy Section of the Agricultural Adjustment Administration followed, and a third policy was inaugurated in the fall of 1934. The policy involved an attempt to introduce reforms and improvements in each market only as fast as conditions and existing institutions justified, and only in so far as such changes would be supported and accepted by those affected. Progress was not only slow but was complicated by legal decisions involving the status of governmental agencies in intrastate commerce. Attempts were made in Congress to pass amendments which would permit licensing of strictly intrastate markets by Federal authorities. These attempts were unsuccessful, but in 1935 amendments were passed which changed the delegation of legislative authority in an attempt to avoid the judgment of the courts that licenses were unconstitutional. The Secretary of Agriculture was empowered to issue "executive orders" in place of the agreements and licenses previously used. These "orders" were to become effective, in the case of milk, when half of the distributors and two-thirds of the producers approved the order. Only a few markets were brought under the Secretary's orders, however, and the status of some of these was

¹ Nourse, E. G.; Davis, J. S.; and Black, John D., *Three Years of the Agricultural Adjustment Administration* (Washington, The Brookings Institution, 1937), p. 226.

² Black, *op. cit.*, pp. 375-392.

not clear because legal proceedings attacking the authority of the orders were instituted, and clarification of the situation depended on later court decisions.

The chaotic conditions still existent in some of the major milk markets result in part from the conflict of authority between the states and the Federal government. Milksheds are not defined by state boundaries, so that milk subject to regulation and sale in some markets is actually produced in other states. In the Boston market in 1936, for example, 52% of the total milk received in Boston originated in Vermont, 14% in Maine, 13.4% in Massachusetts, 12.8% in New Hampshire, 6.9% in New York, 0.8% in Rhode Island, and 0.1% in other states.¹

When the Agricultural Adjustment Administration was declared unconstitutional in January, 1936,² there were confusion and uncertainty as to the status of the Federal "orders" under which many of the markets were then operating. As a direct result, many suits were filed which challenged the authority of the Federal government to control the price of milk. In the spring of 1937 the situation was somewhat clarified in the Butterick case,³ when the First Circuit Court of Appeals declared that invalidation of certain sections of the Agricultural Adjustment Act did not mean that the other sections affecting only interstate commerce were also unconstitutional. Its decision reversed that of the lower court and made the Federal Administrator's decisions in the Boston milk market binding upon the distributors. After a poll of the producers, another equalization pool was inaugurated. Because of the suits which were immediately begun, the equalization payments were held in escrow by the courts. Other milk markets, including Philadelphia, were in a similar state of confusion, and it seemed unlikely that the situation would be clarified until a Supreme Court decision had been handed down.

In September, 1938, after a referendum of producers, a milk-marketing program was inaugurated in the metropolitan New York market under the authority of the Agricultural Marketing Agreement of 1937.⁴ Under this plan minimum prices were set for fluid milk and an equalization pool was established. In June,

¹ U. S. Department of Agriculture, AAA, Dairy Section, Paper No. 12, Table 6, p. 11.

² *United States v. Butler*, 297 U. S. 1, 56 S. Ct. 312.

³ *United States v. David Butterick Co. et al.*, 91, F. (2nd.) 66,

⁴ 50 Stat. 246.

1939, the United States Supreme Court upheld the constitutionality of this plan.¹ In another decision on the same day the Court upheld the equalization pool and marketing plan established by the Federal Administrator in the Boston market.² Thus the principle of Federal jurisdiction over milk prices and payments to producers was established. Although this type of control is not necessarily adaptable to all milk markets, the extension of this principle to other markets may be expected in the future.

Other types of government control included the sponsoring of a stabilization corporation to purchase and hold supplies of butter. This organization, the Dairy Products Marketing Association, purchased 95,200,000 pounds of butter between June and September, 1938.³ Of this amount, 40,000,000 pounds had been purchased by the Federal Surplus Commodities Corporation for distribution through state relief agencies. Previously the same corporation had distributed milk free to persons on relief and to those on the rolls of the Works Progress Administration.

Another form of control which has been developed in recent years has been through the state milk control boards, which were established to carry out the same general program as the Agricultural Adjustment Administration. A number of states, including Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, Wisconsin, and several others, passed state control acts in 1933 and 1934. Most of these acts were of an emergency type, and definite termination dates were set.⁴ Once established, however, many of the boards were continued with some changes in power and a further definition of their administrative duties. As in the Agricultural Adjustment Administration's program, the principal purpose of these acts was to establish fair prices for producers. The acts frequently contained provisions whereby resale prices could be fixed. There were some questions which arose in the administration of these acts, including the legality of exclusion of out-of-state milk.

In California, where the production and distribution of fluid milk and cream are almost entirely intrastate, the State Director of Marketing was enabled, under the Agricultural Code passed in

¹ *United States v. Rock Royal Cooperative*, 59 S. Ct. 993.

² *H. P. Hood & Sons, Inc., v. United States*, 59 S. Ct. 1019.

³ *Chicago Tribune*, Sept. 16, 1938, p. 30.

⁴ *Black, op. cit.*, p. 311.

1933, to determine prices to be paid producers, to formulate marketing and stabilization plans, to issue licenses to distributors, and to register producers.

In 1937 the California legislature passed laws which permitted the Director of Agriculture to set minimum wholesale and retail prices. Included in these acts were provisions whereby impartial surveys were to be made to assist the Director in the determination of prices.¹

The state boards collaborated for the most part with the program of the Agricultural Adjustment Administration, but worked out satisfactory solutions to the market problems in some of the smaller cities which had not operated under the Administration. In the larger markets the experience of the state boards in attempting to control prices and supplies was not so happy.

FOREIGN TRADE IN DAIRY PRODUCTS

The volume of exports of dairy products is insignificant in total, and the amount of dairy products imported into this country is also small. As may be seen in Exhibit 10, the largest amounts of dairy products are exported in the form of condensed and evaporated milk and cream. These exports are, however, only a very minute part of the total amount of milk produced in the United States, since this country consumes practically all the milk it produces. For the small amount of dairy products which enter foreign trade, we are a net importer, mainly because of the relatively large amount of foreign cheese imported.

The principal dairy product in international trade is butter, but the United States tariff of 14 cents a pound effectively prohibits the importation of any considerable amount of foreign butter. The tariff is also instrumental in maintaining the price of butter in this country at levels above the world price, although the differential has been substantially less than the amount of the tariff.² The tariff on butter has been raised successively from 2.5 cents a pound to 6 cents in 1921, to 8 cents in 1922, to 12 cents in 1926, and to 14 cents in 1930.

The duties on milk and cream, established in 1930, also prevent imports. The rate of 56.6 cents a gallon on cream and 6.5 cents a

¹ Tinley, J. M., *Public Regulation of Milk Marketing in California* (Berkeley, University of California Press, 1938), p. 147.

² Renne, *op. cit.*, p. 64.

gallon on milk is a substantial increase over the previous rates of 30 cents a gallon on cream and 3.75 cents a gallon on milk.¹

The tariff on cheese is high also, but since the types of cheese are so distinctive, a substantial quantity is still imported to meet the demands of consumers willing to pay a higher price. The Hawley-Smoot Tariff Act of 1930 set the duty on cheese at 7 cents a pound, but not less than 35% ad valorem.

EXHIBIT 10
UNITED STATES EXPORTS AND IMPORTS OF MANUFACTURED DAIRY
PRODUCTS, AVERAGE, 1925-1929, ANNUAL, 1932-1937
(In thousands of pounds)

Year	Condensed and evaporated milk and cream		Butter		Cheese	
	Exports	Imports	Exports	Imports	Exports	Imports
1925-1929	118,215	2,830	4,558	6,227	4,350	75,680
1932	50,807	1,188	1,605	1,014	1,408	55,623
1933	37,090	1,118	1,191	1,022	1,281	48,397
1934	46,165	310	1,220	1,253	1,377	47,533
1935	37,117	603	958	22,675	1,152	48,933
1936	25,931	2,245	826	9,874	1,136	59,840
1937	30,847	1,554	780	11,111	1,156	60,650

Source: For 1925-1935: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 419, p. 307; Table 430, p. 314; Table 439, p. 320. For 1936: U. S. Department of Commerce, Division of Foreign Trade Statistics, *Foreign Commerce and Navigation of the United States for the Calendar Year 1936* (Washington, Government Printing Office, 1938), Vol. I, pp. 5, 6, 7; Vol. II, pp. 6, 7. For 1937: U. S. Department of Commerce, Division of Foreign Trade Statistics, *Foreign Commerce and Navigation of the United States for the Calendar Year 1937* (Washington, Government Printing Office, 1939), pp. 11, 12, 13, 396, 397.

PRINCIPAL COMPANIES IN THE DAIRY INDUSTRY

Since the distribution of milk is usually confined to the supply of milk in a particular community, there are few large companies whose operations cover a wide territory geographically. The largest company in the dairy industry is the National Dairy Products Corporation; the second largest is The Borden Company; and the third, Beatrice Creamery, Inc. Other large companies in the industry include those specializing in certain types of dairy products, and those companies concentrating in restricted areas.

¹ The reciprocal trade agreement with Canada, which was effective Jan. 1, 1936, reduced the import duty on Canadian cream from 56.6 cents a gallon to 35 cents a gallon, but imports from Canada were limited to a total of 1,500,000 gallons of cream annually.

The *National Dairy Products Corporation* had a sales volume of \$329,000,000 in 1936, and \$351,000,000 in 1937. This company was founded in 1923 through a merger of ice cream manufacturing concerns, but soon expanded with the acquisition in 1925 of Sheffield Farms, Inc., a large distributor in the New York City area. The company continued to expand rapidly, and in 1930 acquired the Kraft-Phenix Cheese Corporation. In 1936 the corporation assumed management control, with an option to purchase, of the Whiting Milk Company, the second largest distributor in the Boston area. The Supplee-Wills-Jones Milk Company, manufacturers of ice cream and distributors of milk in the Philadelphia area, is a subsidiary of the National Dairy Products Corporation. The company also owns the Breyer Ice Cream Company, of New York. The 144 subsidiaries of this company may be classified, according to the principal products handled, as follows: milk, 18 companies; milk and ice cream, 41 companies; ice cream, 20 companies; butter, 5 companies; cheese, 47 companies; buttermilk, 4 companies; specialties, 5 companies; and miscellaneous, 4 companies.¹

The Borden Company was originally organized as Borden's Condensed Milk Company to succeed to the business established in 1857 by Gail Borden, inventor of the vacuum process of condensing milk. The company was the largest in the field until National Dairy Products Corporation surpassed it. Beginning in 1927, The Borden Company expanded its operations rapidly. The Federal Trade Commission estimated in 1932 and 1934 that The Borden Company and its subsidiaries purchased 10% of the wholesale milk sold in the United States.² Sales of the company totaled \$239,000,000 in 1936 and \$238,000,000 in 1937.

The company has subsidiaries in all branches of the dairy business, including fluid milk distribution, condensed milk, ice cream, and cheese. The distributing subsidiaries are located in New York, Chicago, San Francisco, Milwaukee, Kansas City, and Detroit. One of its most famous products is the Eagle brand of condensed milk. Its processed and packaged cheese is sold

¹ U. S. Federal Trade Commission, *Sale and Distribution of Milk Products—Connecticut and Philadelphia Milksheds*, House Document No. 152, Seventy-fourth Congress, First Session (Washington, Government Printing Office, 1935), p. 39.

² U. S. Federal Trade Commission, *Sale and Distribution of Milk and Milk Products, New York Milk Sales Area*, House Document No. 95, Seventy-fifth Congress, First Session (Washington, Government Printing Office), pp. 59-60.

under the Borden trade-mark and is a strong competitor of the Kraft-Phenix cheese.

The *Beatrice Creamery, Inc.*, the third largest company in the dairy field, had sales of \$60,000,000 in the year ending February 28, 1937, and \$64,000,000 in the year ending February 28, 1938. The principal product of this company is Meadow Gold butter, although the company also manufactures ice cream and distributes fluid milk. Manufacturing and processing operations of the company are confined largely to the Middle Western states, where the company owns 2,800 cream-buying stations. Most of its processing plants are located in Illinois and Iowa.

In 1935 the largest-selling brand of butter was Brookfield, which is processed and distributed by *Swift & Company*. The storage, refrigeration, and transportation facilities required for the company's meat business are used for the dairy products. The *Land O'Lakes Creameries*, a large cooperative selling agency, is also an important organization in the distribution of butter. In 1936 this organization made an agreement with *Armour & Company* for the distribution of Land O'Lakes butter and dairy products in areas outside the cooperative's existing market areas.

Other companies in the dairy industry are either concentrated geographically or specialize in one product. The *Carnation Milk Company*, for example, has the largest-selling brand of evaporated milk. The principal operations of this company other than in processing evaporated milk are confined to the West Coast, where a large volume of business is done in cereals, flour, and poultry feed. Its net sales volume for 1936 was \$52,300,000, and in 1937 was \$59,000,000. The *Pet Milk Company*, which is another important producer of evaporated milk, had in 1936 a sales volume exceeding \$25,000,000, and in 1937 sales were \$30,000,000. Operations other than the processing of evaporated milk are relatively unimportant in this company.

Large companies that operate only in one section of the country include *H. P. Hood & Sons, Inc.*, which distributes fluid milk, ice cream, butter, and other dairy products in New England, and is the largest distributor of milk in Boston and several other New England cities. Stock of the company is closely held, and no sales figures are publicly reported. Another such company is the *Golden State Company, Ltd.*, the principal operations of which are confined to the state of California. In 1936 the total volume of

this concern's business in fluid milk, ice cream, butter, and other dairy products was \$24,000,000, and in 1937 the volume was approximately the same. Another such company is the *Philadelphia Dairy Products Company*, which was reorganized in 1936. This company, which had a sales volume of \$18,000,000 in 1936, and \$19,000,000 in 1937, distributes fluid milk and other dairy products in Philadelphia, Harrisburg, and Scranton, Pennsylvania; in Newark, Camden, and shore resorts in New Jersey; in Richmond, Virginia; in Wilmington, Delaware; and in Detroit, Michigan.

Western Dairies, Inc., is primarily a distributor of ice cream on the West Coast. As ice cream consumption declined severely during the depression, this company's sales declined from \$26,000,000 in 1929 to \$11,700,000 in 1933. The company was reorganized in 1935 after going through bankruptcy. In 1936, sales had increased to \$18,000,000 and in 1937, to \$19,000,000.

APPRAISAL OF PROBLEMS IN THE DAIRY INDUSTRY

The most complicated and most important problem in the dairy industry is that of price. The conflicts between producers and distributors center around the question of price, and all the various schemes and plans for controlling the industry have been introduced to insure not only a fair but a relatively stable price. One of the real difficulties in the pricing of milk arises because a new supply is required daily since fluid milk cannot be stored. This situation allows no time for the commodity to go through a central market and be sought by a number of buyers.

The consumer is on the side lines in this struggle since these price relationships are reflected in the retail market only occasionally. The Federal, state, and municipal governments have fought the consumer's battle, both from the standpoint of health and sanitation, and for protection from unfair prices. The consumer is aware of such battles only when advertisements appear announcing price changes.

There could hardly be any argument against the contention that some public control of milk is necessary to insure the maintenance of sanitary conditions and to protect the public's health. Inspection of dairy herds and processing plants, and chemical analysis of the milk can best be handled by an impartial agency with the power to penalize the producer or distributor who does not

conform to the stringent requirements. In this generalization, however, the word "impartial" is most important. Inspectors should apply interpretations of the laws equitably upon all concerned. The inspectors' ratings determine in part the price which the producer will receive for his milk. There is obviously an opportunity for inspectors to observe either with a lenient or critical eye, depending on the circumstances. In any event, human errors of judgment are likely to creep in.

The question as to whether the government, Federal or state, should control prices is another problem, and one not easily answered. It might be argued that, since prices in the milk markets have been far from stable, the obvious solution is to have the government fix minimum prices. An argument could be presented effectively to prove that the production and distribution of milk is a public utility, and hence returns and profits should be regulated. The other side of the argument is presented by the dealers and distributors who say that an equalization pool providing for fixed prices to be paid to all producers would inevitably reduce the quality of the milk. Distributors pay premiums for quality milk so that there is an incentive for the producer to improve quality. There is the further argument that under the pool arrangement the persons who caused the previous instability of the market would be those who would benefit the most from the pool, since they would be the first to desert the agreement and use a rigid and protected price structure to their own advantage.

From the standpoint of the producer and of the consumer, some sort of public control of prices seems logically justified, since the negotiations of a distributor with an individual producer, or even with a group of producers, frequently lead to chaotic conditions. These conditions arise because of the variation in the amount and price of surplus milk, and the varied uses for which a given distributor can sell the milk.

The producers have achieved a better bargaining position and a more equitable price by organization. Some stability might be achieved by a voluntary organization of distributors which would deal with the organized producers; satisfactory legal authority would, of course, have to be found to avoid the restrictions of the Clayton and Sherman Antitrust Acts. Obviously some type of impartial arbitrator would be needed under such a plan, and again this area seems a logical one for government

control. There should be no illusions that such a plan could be introduced in a short time, or that it could eventually solve all the problems in the market, but it does appear that a plan of this kind might point a way to the solution of the problem.

The situation is not one which can be solved in simple fashion, because of the many complex interrelationships. For example, the relation of the dairy industry to the production of dual-purpose beef cattle is an important one, since this marginal supply is a constant threat to stability. Similarly, the relation between fluid milk prices and the price of feed for dairy cattle is also important, particularly for the producer who sells milk as a side line. The possible substitution of evaporated milk for fluid milk when prices are out of line, or when pay rolls are declining, also is a factor which must be included in the milk pricing problem. The increased use of evaporated milk in recent years adds emphasis to this problem.

There has been the suggestion that the solution to such problems might be found in municipally owned processing and distributing facilities.¹ A study was made of the situation in the Milwaukee milk market to determine the feasibility of operating a unified milk-processing and distributing business for the entire city.² This study indicated that prices to producers could be raised, prices to consumers lowered, and profits could be made sufficient to retire the investment in 19 years.³ Economies were to be effected by eliminating the duplication of milk delivery routes, eliminating the excess capacity of the existing distributors, and by introducing country receiving stations. It was pointed out, however, that many factors might affect the operation of the plan adversely. Important among these factors were the elimination of brands, the possibility that a monopoly, although owned by the city, might follow policies which would not be in the public interest, and the disruption of existing institutions. It was also pointed out that many unforeseen problems might not arise until the plant was in operation. Since conditions vary with each

¹ A municipally owned milk distribution system is operated in Wellington, New Zealand. City authorities established this business because the small dealers distributing milk prior to this plan refused to make the necessary investment in sanitary cooling, bottling, and pasteurizing equipment.

² U. S. Department of Agriculture, AAA, Dairy Section, Marketing Information Series, *A Survey of Milk Marketing in Milwaukee* (Washington, Government Printing Office, 1937).

³ *Ibid.*, p. 6.

local situation, such a plan should not be approved as the best solution to the current problems of milk pricing and distribution. Many distributors have performed their functions economically and effectively, and have made a profit from their business operations. The organizations which they have created and the spirit of public service which has been inculcated in some of them could not be replaced overnight, and perhaps not at all. Furthermore, the element of competition would be removed under municipal ownership, and there is not yet sufficient evidence to believe that the competitive system in the dairy industry should be discarded.

One writer¹ proposes a national inspection service as a principal solution to the problems of the dairy industry. Such points as the standardization of inspection between milksheds, which would prevent any possibility of a milk market's being closed to outside producers, and which would, as a result, create sectional milksheds; the increased possibility of longer hauls for fluid milk; the improvement of the standards of inspection; as well as a uniform application of inspection regulations, are cited as advantages to be derived from such a plan. "Its end would be the re-creation of a free and open market for milk."² In other words, local chaos would be reduced to national disorder. It is hardly likely that in the dairy industry a change of form would effect a change of substance. The problems are principally local problems, and any attempt to deal with them on a national basis must make provision for the many variations in local situations. These differentiations seem sufficiently important and numerous to warrant individual attention.

The events of recent years have encouraged the study of the problems in the dairy industry both by government agencies and by private research. Many mistakes have been made, but there seems to be a clearer understanding of the problems which confront the producer and the distributor. It appears probable, therefore, that improvements and changes will come slowly, but that they will be more worth while and effective by virtue of the cautiousness with which they are proposed.

¹ Hamilton, Walton, and Associates, *Price and Price Policies*, Section VIII, "Milk—The Politics of an Industry," by Irene Till (New York, McGraw-Hill Book Company, Inc., 1938), pp. 431-524.

² *Ibid.*, p. 524.

CHAPTER III

THE LIVESTOCK AND MEAT-PACKING INDUSTRY

The livestock industry has been surrounded by romantic glamour since the days of the Texas cattle trail. The meat-packing industry, on the other hand, has evoked annoyance for many reasons: everything from the lingering odors of the abattoir to the alleged malpractices of the "meat trust" has been used as a basis of criticism of the industry. Needless to say, these impressions of the meat-packing industry have been based on scanty evidence and have not reflected true conditions underlying a great industry.

The meat-packing industry, operating under rigidly controlled sanitary conditions, supplies daily food to a nation of 130,000,000 people, and in terms of physical and dollar volume of sales is one of the largest industries of the country. The meat-packing industry is of vital importance to farmers, because beef cattle are kept on 29% of the farms, and hogs are raised on 75% of them.

The products of the meat-packing industry are, for the most part, perishable, and must be rushed to the consumer in a relatively short time. In the case of fresh meat, the maximum time limit between livestock shipment and consumption is three to four weeks. Within this period livestock must be delivered to the central market, slaughtered, processed, distributed to branch warehouses, and sold to the consumer in the retail market. The bulkiness of the product, the volume of business transacted, and the necessary speed of delivery obviously create a problem of transportation. Furthermore, the chief consuming areas are removed by some hundreds of miles from the principal producing areas, since the center of livestock production is west of the Mississippi and the center of consumption east of it. Obviously, close coordination of suitable transportation facilities is essential for the efficient and speedy movement of live cattle and fresh meat.

Although all agricultural industries are tied in closely with transportation, the development of the livestock and meat-

packing industries coincided with and was dependent upon the development of the transportation facilities. The meat-packing plants were established at railroad junctions, and the extension of the railroads westward permitted the development of the range country in the Great Plains. The development of the refrigerated freight car made possible a wide extension of the meat packers' market for fresh meat. In recent years, a new medium of transportation, trucking, has changed the center of gravity for the packing industry and has revolutionized the marketing channels for livestock.

The meat-packing industry is distinctive from most other industries in that it is a process of disintegration rather than a process of assembly. The particular steer or hog is subjected to division into a number of edible and nonedible products after it enters the packing plant. For this reason the allocation of costs creates peculiar problems and is important in the determination of prices for the various products.

TYPES OF LIVESTOCK

The species of livestock raised in this country principally for meat are cattle, hogs, and sheep.¹ Usually livestock producers raise only one species, although some producers located in the range country raise both cattle and sheep, and, in the Corn Belt, farmers may feed both cattle and hogs for the market.

For ranch livestock the most useful classifications are by sex and age. Other qualities depend in part on the ancestry of the animals, and care during their growth, and the type of feed they have consumed. These latter factors are of importance in determining the price which the producer receives when he sells his livestock, and he governs his action accordingly. For example, very few range cattle are shipped directly to packing plants, since a period of intensive feeding is required to put the animals in proper condition for the market. On the other hand, hogs are fed principally on corn, and the majority are shipped directly from the farms where they were bred to the packing houses for slaughter.

¹ Horses slaughtered for meat are not consumed by human beings in this country. The meat is used principally for canned dog food. The production of goats is discussed in Chapter VIII, and the production of dairy cattle in Chapter II.

At the market, livestock are divided into classes based on the sex condition of the animal. Cattle, for example, are divided into five classes: steer, heifer, cow, bull, and stag.¹ Hogs are classified as sows, barrows, stags, and boars.² Sheep are separated as ewes, bucks, and wethers.³ Sex condition is not an important classification in lambs and calves. Within these major classes the subclasses of "slaughter," "feeder," and "stocker," are used to indicate the condition of the animal. Animals in condition for immediate use, or ones where no benefit could accrue from additional feeding, are designated as slaughter. The older and heavier cattle, which can be improved by fattening, are called feeders. The younger and lighter cattle, which usually are fed for a longer period of time, are called stockers. These classifications are not precise and the various types shade into one another.

Other differentiations used in sorting cattle are based on the use for which the particular carcass is destined, and on the age and weight of the animal. Under use are included such subclasses as "butcher," which consists of inferior cows, calves, and heifers; or "bacon," which includes the hogs whose physical structure makes their sides particularly suitable for bacon. The age classifications include designations such as "yearling" or "two-year-old"; and weight is termed by "light-weight," "medium-weight," or "heavy-weight."

Grades which are based on variations in "conformation," "finish," and "quality" are of major importance to the packers, for these grades indicate the type of meat which can be secured from the particular animal. Conformation is judged by the shape and build of the animal; the relative proportions of the various parts of the animal are of the most importance. Breeding determines conformation to a large degree, although feed and care are important. The term "finish" refers to the quantity, distribution, and quality of the fat on the animal. Fat is important in determining the tenderness and flavor of the meat. "Quality"

¹ Steers are males, castrated before sexual maturity; heifers are females, beyond the veal and calf stage, that have never had calves; cows are females which have had calves; bulls are uncastrated males that have reached sexual maturity; stags are males, castrated after sexual maturity.

² Sows are female hogs which have had pigs; barrows are male hogs which have been castrated before sexual maturity; stags are male hogs castrated after sexual maturity; and boars are uncastrated male hogs.

³ Ewes are female sheep; bucks are uncastrated male sheep; and wethers are males castrated usually before sexual maturity.

is a comprehensive term and is judged by the probable condition of the flesh, fat, connective tissue, color, and juice of the meat. In beef, "marbling" or distribution of fat in the meat is also important in determining quality.

The standards for livestock are, for the most part, the same as the standards for dressed meat. This correspondence is obviously necessary, since the principal value of the animal is derived from the type and quality of the meat which can be secured from it after slaughter.¹

DEVELOPMENT OF THE LIVESTOCK INDUSTRY

A few cattle and hogs were brought to this country by the first colonists settling in New England, to provide a supply of meat for the people in the new country. Some of the livestock was slaughtered each fall and "packed" for winter use in barrels of brine. After a few years there was a small surplus available for export, and packed meat was shipped in small quantities to the West Indies. Most of the packing was done by farmers who slaughtered their own livestock, and salted and cured their own meat. This trade was expanded when England was unable to export meat during the Puritan revolt and the Civil War which followed in the 1640's. Domestic production increased slowly with the gradual increase in population, and the southern colonies and Pennsylvania grew more important in the feeble industry of producing livestock.

After the Revolutionary War the migration to the West began. The land companies, such as the Ohio Company and the Scioto Company, promoted the settlement of the fertile lands of the Ohio Territory. These lands were well adapted to the raising of corn, which was used at that time for home consumption, usually in

¹ For a further description of classes and grades of livestock, see U. S. Department of Agriculture, Bulletin No. 1360, *Market Classes and Grades of Livestock* (Washington, Government Printing Office, 1926); U. S. Department of Agriculture, Bulletin No. 1246, *Market Classes and Grades of Dressed Beef* (Washington, Government Printing Office, 1927); U. S. Department of Agriculture, Bulletin No. 1470, *Market Classes and Grades of Dressed Lamb and Mutton* (Washington, Government Printing Office, 1927); U. S. Department of Agriculture, Circular No. 103, *Market Classes and Grades of Dressed Veal and Calf Carcasses* (Washington, Government Printing Office, 1930); U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats and Wool Division, Tentative Standards for Grades of Slaughter Hogs* (Washington, May, 1930); U. S. Department of Agriculture, Bulletin No. 208, *Market Classes and Grades of Yearling Beef* (Washington, Government Printing Office, 1932).

the form of corn meal or for the distillation of spirits. With the establishment of an internal revenue system and an excise tax on whiskey, the cash corn crop was no longer measured in terms of potential gallons but in terms of pounds of cattle and hogs, for the farmers turned from the production of spirits to the production of livestock.

With the growth in numbers of livestock, Cincinnati became the center of the embryonic meat-packing industry, since the town was favorably located on the Ohio River midway between Pittsburgh and St. Louis. It became an important trading center for the agricultural products of the West and South, as well as for the products manufactured in the North and destined for southern retail markets. Banking facilities were developed, an important source of financial assistance to the meat packers. Cured and salted meat became available both for the frontier trade and for shipment east to supply larger communities. The principal meat was pork, since only a small proportion of beef was cured and packed at that time, and as a consequence Cincinnati was known in the 1840's as "Porkopolis." The pork, consisting principally of fat backs and heavy sides, was packed in a pickling fluid in barrels and shipped as barreled pork. Because of the lack of facilities for refrigeration, fresh meat could not be shipped any distance.

Cincinnati owed much of its progress to the river trade, and to the fact that water transportation for its products was readily accessible. Then, too, in the early days it was important for a meat packer to be located on a river into which waste, a large proportion of the output, could be dumped. With the development of the railroads the river towns lost their supremacy to those towns favorably located at railroad junctions or shipping points. The most important of these new centers was Chicago, where cattle markets had been established before 1850. The Civil War created a demand for meat in large quantities, and the trade in livestock at Chicago increased by leaps and bounds. On Christmas Day in 1865, the Chicago Union Stock Yards were opened, and by 1870 Chicago was the largest cattle center in the country.

In the meantime Texas had been admitted to the Union, and the production of cattle in this state had been increasing. The first Spanish settlers had introduced long-horned cattle, and the cattle industry had flourished under liberal land grants, first from

Spain and later from Mexico. After Texas became a state, cattle were driven to New Orleans and to Ohio, and later to Chicago.¹ The cattle industry in Texas reached a standstill during the Civil War, however, since the Union Army's control of the Mississippi River prevented shipments to other Confederate states. After the Civil War, when markets were reopened, Texas became again an important source of supply for cattle, both for slaughter and for breeding.

The railroads were rapidly pushing westward at that time. The combination of transportation facilities and large grazing areas formed an irresistible lure, both to settlers and to persons with capital who saw an opportunity to secure profits from the opening up and development of new territories. "Drovers" made annual trips from the open ranges to railroad shipping points, driving the cattle over slow and tortuous trails to places where they could be shipped east to markets. The earliest trails over which the cattle were driven were from Texas northward to some point on the railroad such as Abilene, Kansas.² The first transcontinental railroad was completed in 1869, and as the Great Plains were opened up and populated with cattle principally from Texas, the railroads tapped this source of supply directly. Cattle were still driven northwestward to the Great Plains range country until railroads from the transcontinental lines were extended southward to Texas. Trail driving had completely disappeared by 1900, although Texas continued to be the most important cattle-producing state in the country.

The range industry grew rapidly during the 1870's and 1880's. Investors in England, Scotland, and the East poured capital into the West with high hopes of "bonanzas." Cattle grazed on the open ranges and sometimes were seen only at roundups. By this time the refrigerator car had been developed, the major packing companies established, and the market for meat products extended and expanded. The development of city water and sewage systems also enabled the packers to enlarge their plants and improve sanitation. As a consequence, there was a steady

¹ Dale, E. E., *The Range Cattle Industry* (Norman, University of Oklahoma Press, 1930), p. 24.

² The first shipment of cattle driven to Abilene was made Sept. 5, 1867. During the next three years over 1,100,000 head of cattle arrived by trail at this shipping point. The celebrations and activities of the cowboys after they arrived in town after days on the trail were supervised by the Marshal of the town, Wild Bill Hickok. *Abilene Daily Chronicle*, June 12, 1938, p. 4.

demand for meat, and a good market for all the cattle that could be produced.

The disastrous winter of 1886-1887, however, during which many thousands of cattle froze or starved to death, wrecked a number of the cattle companies. In the meantime settlers had been coming into the country in large numbers, and by 1890 it was apparent that the days of the open range had passed.¹ The range industry was enclosed by fences; instead of a promotional venture it became strictly a business proposition.

The production of hogs was more directly related to other agricultural pursuits, since corn was needed for feed. As a consequence, hog production was never a pioneer industry and moved westward only as the center of farm production progressed westward. Corn acreage in the Corn Belt states was increased rapidly after the Civil War, however, and production of hogs increased.

PRODUCTION OF LIVESTOCK IN THE UNITED STATES

In the preparation of livestock for market, two types of operations, breeding and feeding, frequently take place in two different areas by two producers, although some producers "finish" their animals for immediate slaughter. Beef cattle and sheep are produced in largest numbers in the range states of the West² and are then sent either directly to market if they are "grass-fat," or to feeding areas, in the same or adjacent states, for further fattening before slaughter. Hogs are produced for the most part on farms in the Corn Belt states, and only a very few are sent to other farms for feeding before slaughter.

Texas, Nebraska, Kansas, and Oklahoma are the principal states producing beef cattle, although Montana, Wyoming, Colorado, New Mexico, North and South Dakota, and California are also important. It is difficult to show statistically the relative importance of these states in the production of livestock because

¹ The settlers changed the range industry, not only because of the land which they occupied but also by their acquisitiveness for branded and unbranded cattle running loose on the range. John Clay remarks in his privately printed memoirs, *My Life on the Range*: "At this late day (1917) cast your eye over the list of Wyoming cattlemen and you will find quite a goodly list who began at this time (1888) with a rope and a branding iron and now have respectable herds of cattle."

² The approximate eastern boundary of the western range would be a line extending southward from central North Dakota, passing west of Sioux Falls, Omaha, Wichita, Oklahoma City, and Fort Worth. U. S. Farm Credit Administration, Cooperative Division, Circular No. C-103, *Western Cattle and Sheep Areas*, by L. B. Mann (Washington, Government Printing Office, 1936), p. 7.

the feeding operations in such states as Iowa, Illinois, and, to some extent, California are important in the data showing beef cattle on the first of January during census years. Furthermore, the dairy industry in such states as Minnesota, Wisconsin, New York, as well as Iowa, produces large numbers of calves and dairy cattle for slaughter. In addition, the droughts of recent years have affected the distribution of cattle because of dry ranges and diminished feed supplies. Subject to these limitations, the data in Exhibit 1, which are estimates based on the census data, can be used to give a rough approximation of the relative importance of the principal cattle states.

EXHIBIT 1
NUMBER OF CATTLE IN PRINCIPAL CATTLE-PRODUCING STATES,
JANUARY 1, 1939
(In thousands)

State	Cattle and calves on farms Jan. 1, 1939*	Milk cows and heifers on farms Jan. 1, 1939*
Texas.....	6,955	1,458
Iowa.....	4,465	1,472
Minnesota.....	3,341	1,705
Wisconsin.....	3,339	2,170
Nebraska.....	2,909	648
Kansas.....	2,789	773
Illinois.....	2,699	1,134
Missouri.....	2,547	945
California.....	2,206	600
Oklahoma.....	2,182	720
New York.....	2,137	1,423
Ohio.....	2,030	1,043
Michigan.....	1,675	923
Indiana.....	1,633	758
South Dakota.....	1,567	513
Colorado.....	1,447	243
North Dakota.....	1,238	528
New Mexico.....	1,190	76
Montana.....	1,016	155
Wyoming.....	836	67
Total other states.....	18,620	7,670
Total United States.....	66,821	25,003

* Preliminary.

Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 16, No. 2, February, 1939 (Washington, Government Printing Office), pp. 28 and 29.

One of the most important cattle-producing areas is the Panhandle of Texas. This section produces feeders. It ships steers in the spring to Oklahoma and Kansas for summer finishing on grass,

and in the fall to the Kansas City, Wichita, St. Joseph, and Fort Worth markets, where the steers are purchased by feeders for winter feeding on concentrated grains. Some Texas steers are carried during the winter in near-by areas, where the principal feed¹ is cottonseed hulls and cake.

Another important producing area, which has suffered from the recent droughts but is still an important breeding center, is the eastern Colorado and western Kansas high plains. Cattle are sent to market in Denver, Kansas City, and Wichita or to feeders in northeastern Colorado and in Kansas. The Colorado feeders use beet pulp along with alfalfa and grain.² A near-by producing area of importance is northern Nebraska, which supplies a considerable volume of cattle to Nebraska, Iowa, and Illinois feeders.

The distinction between the breeders, who produce beef cattle as well as dual-purpose cattle which can be used for dairy herds or sent to market for slaughter, and the feeders, who fatten the cattle for market, is not clear-cut, and there is some overlapping of functions. One type of feeder is the stocker, who usually fattens the cattle, both on grass and on feed, and consequently buys cattle requiring a longer period of time to bring to marketing condition than do the cattle bought by other feeders. The same producer will sometimes perform the function of both the stocker and the feeder. The feeder usually fattens cattle on corn, cottonseed meal, or beet pulp, for a period of from three to six months. A profit is derived not only from the increase in weight but also from the better finish and quality of the grade of meat produced when the cattle are slaughtered. Cattle are designated as feeder or stocker in the central market; the younger and lighter cattle, usually weighing under 700 pounds, are generally called stocker, and the older and heavier cattle, usually weighing over 700 pounds, are generally called feeder. The stocker cattle are usually so thin and small that they need several months of grass fattening before it is economically sound to give them concentrated feeds. In 1938 a little more than 17% of the total receipts of cattle and calves at public stockyards were shipped out again as stockers and feeders.³ In addition, there was an indeterminate number shipped direct from breeders to feed lots.

¹ U. S. Farm Credit Administration, Circular No. C-103, p. 39.

² *Ibid.*, pp. 29-30.

³ U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data, 1938* (Washington, May, 1939), pp. 10 and 13.

The large majority of hogs are shipped directly from the breeder to the public stockyards and slaughtered without any additional feeding operations. In 1937 less than 2% of the total hog receipts at public stockyards were shipped out as feeders.¹ The reason for this is, of course, that hogs are fed on corn, and the principal hog-producing states are the same as the principal corn-producing states. The distribution of hog production by states is shown in Exhibit 2.

EXHIBIT 2

NUMBER OF HOGS ON FARMS IN PRINCIPAL HOG-PRODUCING STATES
JANUARY 1, 1939*
(In thousands)

Iowa.....	8,179
Illinois.....	4,423
Indiana.....	3,405
Missouri.....	3,120
Minnesota.....	2,737
Ohio.....	2,737
Nebraska.....	1,908
Texas.....	1,820
Georgia.....	1,554
Wisconsin.....	1,454
Total other states.....	17,584
Total United States.....	40,011

* Preliminary.

Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 16, No. 2, February, 1939 (Washington, Government Printing Office), p. 31.

Sheep are raised for two purposes, the production of wool and the production of meat. For this reason, sheep producers have attempted to breed a dual-purpose animal which would not only produce as high a quality of wool as possible but whose size and conformation would make it valuable as a meat animal. The Merino sheep, a native of Spain, has been noted for the quality and value of its wool. All wool was formerly classified on the basis of the proportion of Merino blood in the sheep producing the fleece. The Merinos have been crossbred with other types which are larger and produce better quality and greater quantities of meat.

The production of sheep is similar to that of cattle, both in the geographical location of the producing areas and in the feeding operation, which usually takes place at some point other than where the sheep or lambs are bred. Because, however, of the American public's preference for lamb rather than mutton,

¹ *Ibid.*, pp. 11 and 13.

the slaughter of lambs is considerably more important than the slaughter of mature sheep.

Since lambs usually must be fattened before marketing, the feeders' function is important. The most important feeding area is northeastern Colorado, where a large supply of beet pulp is available from the sugar-beet factories. The lambs are shipped into this section in October and early November, and are marketed during the early spring. The Corn Belt states are also important lamb feeders.

A new type of lamb feeder, known as the contract feeder, has developed rapidly since 1930. Although some cattle have been fed on the same basis, contract feeding has been more important in the preparation of lambs for market. In contract feeding a grower and a feeder sign a contract whereby the grower agrees to provide the livestock while the feeder supplies the feed and labor. In 1934 it was estimated that over half a million lambs and ewes and about 50,000 cattle had been fed on contract, with cooperative associations handling approximately 40% of this volume of business.¹ This new development arose when the curtailment of credit in the livestock market became acute in 1931 and 1932. Then, too, the accompanying low prices of feed induced farmers to try this method of converting feed into a more valuable commodity, and the low prices for livestock in the central markets encouraged growers to defer the sale of their livestock. The drought in the range country in 1934 resulted in large shipments to the markets. The low prices which followed encouraged a further increase in this type of feeding operation.²

Three types of contracts are generally in use: the gain-basis, the investment-type, and the custom-type contract. Of these, the most frequently used is the gain-basis contract. The farmer feeding the animals is paid a specified sum for each pound gained during the feeding period of from sixty to ninety days. The investment-type contract is based on the amount of the investment by the grower and the feeder in the animals; profits or losses are prorated on the basis of this investment. Under the custom-type contract, the feeder is paid a stipulated amount per head for

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 15, *Contract Feeding and Pasturing of Lambs and Cattle*, by C. G. Randell (Washington, Government Printing Office, 1937), p. III.

² U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 15, pp. 4-8.

feeding the livestock. In some cases the breeder furnishes the feed. In all cases the breeder retains title to the livestock.¹

The census data on sheep and lambs are more indicative of the important producing states than are the cattle statistics, since sheep and lambs on feed for market are excluded from the sheep and lamb statistics. The important producing states are shown in Exhibit 3.

EXHIBIT 3
NUMBER OF SHEEP ON FARMS IN PRINCIPAL SHEEP-PRODUCING STATES,
JANUARY 1, 1939*
(In thousands)

Texas.....	9,646
Wyoming.....	3,614
California.....	3,537
Montana.....	3,010
Utah.....	2,377
New Mexico.....	2,269
Ohio.....	2,166
Oregon.....	2,084
Idaho.....	1,879
Colorado.....	1,718
Total Other States.....	15,762
Total United States.....	48,062

* Preliminary.

Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 16, No. 2, February, 1939 (Washington, Government Printing Office), p. 32.

RELATIONSHIP BETWEEN THE CORN CROP AND
LIVESTOCK PRODUCTION

The corn crop has the highest farm value and requires a larger total acreage than any other crop in the United States. In 1935 and 1936 the farm value of the corn crop approximated \$1,500,000,000. An average of approximately 100,000,000 acres is planted to corn each year. Approximately 90% of the corn produced is fed to livestock and poultry, the largest proportion being fed to hogs. As a consequence, only a relatively small part of the corn crop is shipped out of the county in which it is harvested.

The average use of the corn crop for the years 1910-1914 and 1924-1929 is shown in Exhibit 4. The relative proportion of the crop consumed by hogs has increased, and it has been estimated that hogs now consume almost half the entire corn crop. Indus-

¹ Nebraska Agricultural Experiment Station, Bulletin No. 274, *The Contract Feeding of Livestock*, by R. R. Tholman (Lincoln, University of Nebraska, 1932).

trial uses of corn have been augmented, however; and human consumption has increased, because the repeal of prohibition in 1933 increased the demand for corn to be used in the distillation of spirits.

EXHIBIT 4
UTILIZATION OF THE CORN CROP, 1910-1914 AND 1924-1929

Use	Percentage of crops	
	1910-1914	1924-1929
Fed to:		
Horses and mules on farms.....	17.4	13.9
Cattle on farms.....	16.2	19.3
Hogs on farms.....	36.8	41.6
Sheep on farms.....	1.0	1.0
Poultry on farms.....	9.0	10.4
Livestock not on farms.....	7.0	2.5
Industrial and commercial utilization.....	9.0	8.8
Exports.....	1.7	0.8
Food for farm families.....	1.2	1.0
Seed.....	0.7	0.7
Total.....	100.0	100.0

Source: FitzGerald, Dennis A., *Corn and Hogs under the Agricultural Adjustment Act—Developments up to March, 1934* (Washington, The Brookings Institution, 1934), p. 6.

Because the farmer has the alternative of selling his corn in the market or of feeding it principally to hogs, the relationship between the prices of the two products is important to him. The well-known "corn-hog ratio"¹ is the usual form of expressing this relationship. This ratio is based on "the number of bushels of corn, the market value of which equals the market value of 100 pounds of live hogs."² The values at the farm obviously represent the closest approximation, for there the farmer makes the decision as to whether or not corn shall be fed to hogs or shipped to market. The ratio usually averages about 11:1, although from 1924 to 1937 the ratio fluctuated from 6.3:1 to 18.7:1.³ The price of corn determines in part the volume of

¹ Farmers and agricultural economists call it the corn-hog ratio, the packers term it the hog-corn ratio, and apparently the accepted library classification is the "maize-swine" ratio!

² Stanford University, Food Research Institute, Miscellaneous Publication No. 6, *Corn and Hog Surplus of the Corn Belt*, by A. E. Taylor (Stanford, Stanford University Press, 1932), p. 93.

³ In other words, at one time 6.3 bushels of corn had the same value on the farm as did 100 pounds of hogs, and later corn was so cheap in relation to hogs that

hogs which will be sent to market. Consequently, in studying the price and supply of hogs, present and future, the price and supply of corn are of great importance.

According to Haas and Ezekiel, the ratio at which farmers would apparently neither increase nor decrease their production of hogs is slightly below 11.4:1.¹ In other words, if the ratio were above this at, say, 14:1, farmers would feed corn to hogs, since the latter would bring a better return at prevailing prices than the former. If the ratio were below 11.4:1, corn would bring a better return if it were sent direct to market rather than sold in the form of hogs, and the production of hogs would decrease by the amount of feed which would be sold direct.

There has been for many years a tendency for hog production and the number of receipts at central markets to move in regular cycles, usually about three years in length, from one high point to another.² These high points seem to follow by some 18 months the point where corn is cheap in relation to hogs and where terminal receipts of hogs are small. Apparently farmers are impressed by the relatively high prices for hogs, and breed more sows³ than usual, ship the litter to market after fattening, some 16 to 18 months later, only to discover that many other farmers have taken the same action, and as a result receipts are high and prices low. The process is then reversed; fewer sows are bred, and a few months later the opposite situation exists, with receipts small and prices high. In other words, plans for the future are made on the basis of current conditions, rather than probable future conditions. Some lag is inevitable, of course, between the time production plans are actually changed and the time that such changes are apparent in shipments and receipts in the market.

it required 18.7 bushels of corn to total the same dollar value as 100 pounds of hogs. These ratios are calculated on the basis of average farm prices in the United States. In terms of prices in the North Central states, the ratio varied from 6.9:1 in July, 1924, to 21.2:1 in June, 1926, and from 7.1:1 in June, 1934, to 19.3:1 in February, 1936. U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data, 1937* (Washington, May, 1938), p. 52.

¹ U. S. Department of Agriculture, Bulletin No. 1440, *Factors Affecting the Price of Hogs*, by G. C. Haas and Mordecai Ezekiel (Washington, Government Printing Office, 1926), footnote, p. 21.

² *Ibid.*, p. 20.

³ The gestation period of a brood sow is shorter than that for a cow or ewe, and from six to twelve offspring are produced, compared to the usual one or occasional two produced by the cow or ewe.

Almost three-fourths of the nation's corn crop comes from the states of Ohio, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, South Dakota, Nebraska, and Kansas.¹ This area coincides with the area producing the largest number of hogs. Although corn is the principal feed for hogs, other grains and supplementary feeds are used (see Exhibit 5).

EXHIBIT 5
QUANTITIES OF FEED USED IN PRODUCING 100 POUNDS OF MARKETABLE
PORK; CENTRAL ILLINOIS FARMS, 1924-1926

Feed:	Pounds Used
Corn.....	400.3
Wheat.....	2.1
Rye.....	0.6
Barley.....	2.3
Oats.....	38.6
Mill Feeds.....	6.0
Skim Milk.....	3.9
Tankage.....	13.0
Linseed Meal.....	1.8
Soybeans.....	4.6
Total concentrates.....	473.2

Source: University of Illinois, Agricultural Experiment Station, Bulletin 390, *Some Important Factors Affecting Costs in Hog Production*, by R. H. Wilcox, W. E. Carroll, and T. G. Hornung (Urbana, University of Illinois, 1933), p. 9.

FINANCING THE PRODUCTION OF LIVESTOCK

Livestock production is financed from four sources: commercial banks, cattle loan companies, livestock commission companies, and government agencies.² Loans are made to breeders, stockers, and feeders, and the loans are usually secured by chattel mortgages. Loans to the breeders are usually made for a period of six months with a privilege of renewal; some are renewed four or five times. Loans to stockers are usually made for a period of six months to cover the summer grazing and late feeding, although they may run considerably longer in some cases. Loans to feeders are made for a period of from two to four months, since this fattening operation takes a comparatively short time.

Before 1900, livestock commission firms supplied the largest proportion of loans on cattle, but in 1937 this source of financial

¹ For a further description of corn production and consumption, see Chapter V, "The Grain Trade."

² Including the Federal Intermediate Credit Banks, which discount notes from production credit associations, private financing institutions, cooperative associations, and banks for cooperatives.

aid was negligible. Cattle loan companies were important in the financing of livestock from 1900 to 1920, but many of them were wiped out in the drastic price decline in 1921. Some of the packers financed cattle loan companies; between 1910 and 1920 the West was overrun with solicitors looking for prospective customers for loans. Commercial banks have always financed part of the livestock loans, but they too suffered from the difficulties of the early 1920's and suffered more severely from the depression of the early 1930's. The government took a hand in this situation after the collapse of prices in 1921, when the War Finance Corporation was authorized to make livestock loans through banks, cooperatives, and other financial institutions. The Federal

EXHIBIT 6
LIVESTOCK FINANCING LOANS AND DISCOUNTS OUTSTANDING WITH THE
FEDERAL INTERMEDIATE CREDIT BANKS, BANKS FOR COOPERA-
TIVES, AND REGIONAL AGRICULTURAL CREDIT CORPORATIONS,
DECEMBER, 1936, AND DECEMBER, 1937

Institution	Dec. 31, 1936	Dec. 31, 1937
Federal Intermediate Credit Banks:		
Production credit associations.....	\$ 54,399,751	\$ 66,655,132
Private financing institutions.....	34,317,894	31,020,833
Cooperative associations.....	37,300	35,600
Banks for cooperatives.....	1,034,040	1,274,343
Regional agricultural credit corporations.....	11,804,810	6,011,695
Total.....	\$101,593,795	\$104,997,603

Source: Farm Credit Administration, Division of Finance and Research.

Intermediate Credit Banks also assisted in the financing of livestock by rediscounting livestock loans for banks, livestock loan associations, and cooperative associations. With the establishment of the Farm Credit Administration another source of farm aid was made available through the Production Credit Associations. By 1937 a substantial part of the credit extension to the livestock producers came from government sources. Data in a study covering the year 1934 indicated that government agencies, both temporary and permanent, were extending over 70% of the credit to the livestock industry. Commercial banks were extending approximately 18%, agricultural credit groups and livestock loan companies discounting with the Federal Intermediate Credit

THE LIVESTOCK AND MEAT-PACKING INDUSTRY 83

Banks were extending less than 10%, and commission firms were extending the remaining 2%.¹

The amount of livestock loans from government agencies outstanding at the end of 1936 and 1937 was as shown in Exhibit

EXHIBIT 7
FEDERAL INTERMEDIATE CREDIT BANKS, LIVESTOCK FINANCING LOANS
AND DISCOUNTS FOR FINANCING INSTITUTIONS, AS OF DECEMBER,
1936 AND DECEMBER, 1937

Type of Livestock	Dec. 31, 1936	Dec. 31, 1937
Production Credit Associations:		
Cattle:		
Range and Breeder.....	\$23,574,073	\$21,559,743
Feeder.....	6,106,648	9,248,758
Dairy.....	9,240,277	15,977,905
Sheep and Goats:		
Range and Breeder.....	14,292,595	17,558,250
Feeder.....	1,186,158	2,310,476
Total Production Credit Associations....	\$54,399,751	\$66,655,132
Other Financing Institutions:		
Cattle:		
Range and Breeder.....	\$17,908,881	\$12,611,309
Feeder.....	3,319,328	3,606,847
Dairy.....	1,257,475	1,814,870
Sheep and Goats:		
Range and Breeder.....	11,017,439	11,252,566
Feeder.....	814,771	1,735,241
Total Other Financing Institutions.....	\$34,317,894	\$31,020,833
Total:		
Cattle:		
Range and Breeder.....	\$41,482,954	\$34,171,052
Feeder.....	9,425,976	12,855,605
Dairy.....	10,497,752	17,792,775
Sheep and Goats:		
Range and Breeder.....	25,310,034	28,810,816
Feeder.....	2,000,929	4,045,717
Total.....	\$88,717,645	\$97,675,965

Source: Farm Credit Administration, Division of Finance and Research.

6. In Exhibit 7 are shown, by types of livestock, the loans discounted at Federal Intermediate Credit Banks by production credit associations and private financing institutions.

¹ Jordan, H. J., "The Extension of Credit to the Livestock Industry," *Summaries of Doctoral Dissertations, Northwestern University*, Vol. IV (Chicago, Northwestern University, 1936), p. 17.

GOVERNMENT CONTROL OF LIVESTOCK PRODUCTION

After the disastrous decline in agricultural prices in 1920, the demand for legislative assistance to farmers increased. The principal appeal in the requests at that time was for financial aid, since many of the institutions supplying credit to farmers had collapsed when margins on loans were wiped out by the price declines. Wheat and cotton, the principal export crops, commanded the most attention. Livestock was included in all the bills proposed at this time to aid the farmer by raising domestic prices through the "equalization-fee," "export debenture," and "domestic allotment" plans. The hog and cattle producers were apathetic to these proposals, apparently because of the complex relationships between cattle, hog, grain, and feed prices and the probable effect of the proposals on these prices.

Hogs and field corn were included as basic agricultural commodities in the original Agricultural Adjustment Act approved in May, 1933. These two commodities were linked together because of the close relationship of the corn crop to livestock production. Cattlemen opposed the inclusion of cattle in the original act, since they believed that processing taxes would raise the price of beef above that of substitutes such as poultry, eggs, and fish. The packers also opposed the processing tax, and stated that the farmers would have to bear the burden of the tax in the form of lower prices. Furthermore, the cattlemen had their own ideas as to how the position of their industry could be improved by tariffs on beef and "competing fats and oils," an increase in the tariff on hides, reduction in freight charges, and by "orderly marketing."¹

The packers and the Agricultural Adjustment Administration had been attempting, during the winter of 1933-1934, to iron out differences of opinion in the draft of a marketing agreement. After several compromises both sides felt that the agreement did not cover the real objectives, and the matter was dropped because of lack of interest. In 1934, with a large supply of beef cattle ready for market and increasing numbers of breeding stock, cattlemen supported the amendment to the Agricultural Adjustment Act designed to make cattle a "basic commodity." The

¹ FitzGerald, D. A., *Livestock Under the AAA* (Washington, The Brookings Institution, 1935), pp. 174-176.

Jones-Connally Act¹ added cattle along with some other commodities to the original list of "basic commodities" covered under the Agricultural Adjustment Act. An odd feature of the cattle plan was the fact that no specific provision was made for the establishment of a processing tax to supply funds to carry out a production control program. Apparently the opposition of the cattlemen and packers was sufficient to cause the administration to eliminate, in connection with cattle, a vital part of the general agricultural control program. An appropriation of \$200,000,000 was approved to finance surplus reductions and production adjustments and to support and balance cattle markets. An additional \$50,000,000 was appropriated to purchase dairy and beef products for relief purposes and to eliminate diseased dairy and beef cattle.²

The livestock program of the Agricultural Adjustment Administration may be summarized as follows: (1) the reduction of the 1934 market supply of hogs; (2) production control of corn and hogs in 1934-1935; (3) direct cattle purchases in 1934; and (4) corn loans in 1933-1934 and 1934-1935.³

The first step in the original corn-hog program of the Agricultural Adjustment Administration was similar to the cotton plow-up campaign, in which the surplus was actually destroyed. Over 6,000,000 pigs and breeding sows were purchased in the summer of 1933 to be slaughtered for the dual purpose of increasing the farmers' income and of reducing the surplus supply. Large quantities of the pork were distributed for relief purposes.

Production control measures were similar to other Agricultural Adjustment Administration controls, in that farmers were promised benefit payments if they agreed to reduce their acreage of corn and their production of hogs. In the 1934 contract farmers were required to make a 25% reduction in hog production and not less than a 20% reduction in corn production. Those signing the contract were to receive benefit payments on corn equivalent to 30 cents a bushel, based on the average yield in 1932 and 1933 on the acreage taken out of production. Payments also were made of \$5 a head on hogs which the producer was permitted to raise. These payments were financed by a processing tax on corn for nonfeed uses of 5 cents a bushel and a tax on hogs, originally set

¹ Public No. 142, Seventy-third Congress, 48 Stat. 528.

² FitzGerald, *op. cit.*, p. 183.

³ *Ibid.*, p. 50.

at 50 cents a hundred pounds, but later raised to \$2.25 a hundred pounds. The 1935 contract was similar to that signed in 1934, except that the farmer was required to reduce hog production and corn acreage by only 10%, and benefit payments on corn not raised were made at the rate of 35 cents a bushel.¹

The 1934 drought necessitated a substantial revision of the plans of the Agricultural Adjustment Administration. This drought was one of the most serious in the history of the country. It was most devastating in the cattle country, but was also very serious in the corn and hog belt. Adjustment contracts were changed to permit additional plantings of corn, and the government soon launched an ambitious program for the purchase of cattle. A total of 8,300,000 cattle and calves was purchased by the government.² Approximately 18% of the animals purchased were condemned. A larger proportion, nearly 63%, were slaughtered and turned over to state relief associations in the drought states, and 1,600,000, or slightly more than 19%, were shipped to eastern and southern states to graze.³

Loans were made on corn at the rate of 45 cents a bushel, with the result that loans of \$122,000,000 were made on 271,000,000 bushels of corn in the 1933-1934 season. This corn was stored on the farms under government seal, and was released as the corn was needed. With the anticipation of a short crop for 1934-1935 because of drought, the price of corn rose, and farmers were able to sell their stored corn at a price which permitted them to repay government loans with interest and still realize a profit.⁴ The offer to make loans on corn was renewed in 1934 to cover the 1934-1935 crop. The loan price, although raised to 55 cents, was deliberately set below the market price, which was high because of the short crop. As a consequence there was little incentive for the farmer to borrow from the government. Another corn loan was authorized late in 1935; the rate was fixed again at 45 cents for corn of a certain quality. The general quality of the 1935 crop was very poor, and corn prices were again well

¹ Nourse, E. G., Davis, J. S., and Black, John D., *Three Years of the Agricultural Adjustment Administration* (Washington, The Brookings Institution, 1937), pp. 102-104.

² FitzGerald, *op. cit.*, p. 201.

³ *Ibid.*, p. 208.

⁴ All the loans made by the government under this program were repaid, 99.95% of them by the original borrowers. *Ibid.*, p. 217.

above the loan rate. As a result, only a small amount of corn was used as security for loans.¹

It has been estimated that the net result of all the efforts of the government's corn-hog program was an increase in the gross income of the farmers of approximately \$320,000,000.² The effect of the drought was far more important than that of the Agricultural Adjustment Administration program, however, and the net results of the act are somewhat obscure. The purchase of cattle by the government because of the drought was beneficial to the producers, not only because the price paid was higher than that which would have been received in the markets, but also because the removal of these cattle from the market permitted the price to remain at a higher point for those cattle which were sold. On the other hand, the policy of shipping cattle to areas where they could be cared for was more in the nature of conservation than restriction of production. Furthermore, the distribution of meat to people on relief can hardly be measured in terms of dollars. Those farmers who stored their corn in 1933 and borrowed from the government were definitely benefited by the government's program.

Whether or not the producer actually paid the processing tax on hogs by receiving a lower price than he otherwise would have is a matter of considerable controversy. Although the incidence of taxation is difficult to trace, there is some reason for believing that actually the benefit payments were being placed in one pocket of the farmer, while at the same time the processing tax was being taken from the other pocket. Naturally, packers would try to set their bids for hogs at such levels as would permit them profitably to sell their products, both fresh and processed, in the retail markets where pork products would be competing for the consumers' income along with other meats and food products not subject to tax. Then, too, while supplies of hogs were below normal as a result of drought and of government slaughter, the packers' plants were being operated below capacity, a situation which was resulting in higher unit expenses. This situation alone obviously created some increase in the prices for pork products. Packers, like other businessmen, attempt to secure

¹ Nourse, Davis, and Black, *op. cit.*, pp. 157-163.

² *Ibid.*, p. 307.

as high a price as possible and still move the goods in process or inventory in order to maintain profit margins. Normally a packer's overhead and profit margin amounted to far less than this \$2.25 a hundredweight tax, and to have paid it himself would have made him bankrupt. As a matter of fact, many small packers defaulted on processing tax payments and would have been in financial difficulties if they had been forced to pay the tax, which was voided by the Supreme Court's decision in January, 1936. It is debatable whether or not the packers' difficulties arose because of actually absorbing the tax or because of reduced supplies and consumption, coupled with increasing costs and the subsequent shortage of working capital. There is no doubt that hog producers believed that they themselves were paying the tax; obviously cattlemen believed it when they made such a staunch and successful fight against the processing tax on cattle.

LOCAL AND CENTRAL MARKETS FOR LIVESTOCK

Livestock is sold in local livestock markets, central markets, or directly to packers, and frequently animals will pass through more than one market on their way to the packers. The marketing process is determined partly by the type of animal and its condition and partly by the location of the market, since local markets in the range country differ from those in the feeding areas.

Local Markets.—Local markets for cattle in the range country are hardly more than concentration or shipping points. Buyers in these markets include order buyers who fill orders for shipments to packers and others for a commission, and local dealers who buy to ship to the central markets or to sell cattle as feeders. The producer who does not sell in the local market may ship direct to a commission firm in the central markets if he has a sufficient number of animals to make up a full carload.

In some producing areas the local markets usually include concentration yards as important adjuncts. These are private stockyards, owned by packers or independent buyers, for the purpose of assembling livestock for reshipment to the central markets or direct to packing plants. Frequently these yards are located where it is possible for the through rate on shipments between points of origin and destination to be maintained, even

though the livestock is sorted, assembled, and weighed during the stopover in the yards.

The principal buyers in these local markets include (1) local livestock dealers,¹ (2) order buyers, (3) interior packers, (4) representatives of the central market packers, and (5) local butchers. In some markets livestock shipping associations operate to enable producers selling small quantities to pool their shipments into carload lots for transportation to the central markets. The increased use of trucks and the increase of direct purchases by packers have resulted in a substantial reduction in these shipping associations in recent years. Some of these shipping associations now use trucks exclusively to haul the livestock of their members to near-by central markets.²

Livestock auction markets have been increasing in number during recent years. There were 1,200 livestock auction markets in 1937, of which 900 were in the Corn Belt states.³ The auction markets provide an opportunity for the feeder to secure stock directly rather than from the central markets. For the packer looking for finished animals, the auction is merely another form of direct buying. In a survey of the 30 principal auction markets in Ohio, it was found that packers and local slaughterers purchased 75.5% of the fat hogs and 87.8% of the fat cattle, while farmers purchased 73.0% of the feeder hogs and 88.1% of the feeder cattle.⁴

Some idea of the relative importance of the different methods of sale may be secured from the study made by the Department of Agriculture on the marketing of hogs in 1933. This study shows that the percentage of hogs sold by the producers through the various market outlets was as follows: public stockyards, 45%; local buyers, 22%; local packers, 14%; cooperative shipping

¹ Local livestock dealers buy a large proportion of the livestock in local markets, particularly of hogs. In 1933 these local dealers supplied 34% of the hogs delivered by truck at packing plants, 14% delivered by truck at concentration yards, 11% at auctions, and 3% at public markets. Local dealers supplied 55% of the hogs delivered by rail at packing plants, 79% delivered by rail at concentration yards, 34% at auction, and 30% at public markets. U. S. Department of Agriculture, Miscellaneous Publication No. 222, *The Direct Marketing of Hogs* (Washington, Government Printing Office, 1935), p. 103.

² University of Minnesota Agricultural Experiment Station, Bulletin 302, *Livestock Shipping Associations in Minnesota* (St. Paul, 1934), p. 17.

³ U. S. Department of Agriculture, Bureau of Agricultural Economics, *Report of the Chief, 1937* (Washington, 1937), p. 16.

⁴ Ohio Agricultural Experiment Station, Bulletin 557, *The Livestock Auction in Ohio* (Wooster, 1935), p. 24.

associations, 11%; concentration yards, 6%; and local auctions, 2.6%.¹

Central Markets.—The central markets for livestock are known as terminal markets or public stockyards. There were a total of 104 recognized² markets in 1937, but the total receipts in 1937 of nine of these markets were more than half the total receipts at all markets. These nine principal markets are in Chicago, East St. Louis, Omaha, South St. Paul, Denver, Kansas City, Fort Worth, Sioux City, and St. Joseph. The total receipts of various types of livestock at these markets were as shown in Exhibit 8.

EXHIBIT 8
RECEIPTS OF LIVESTOCK AT PRINCIPAL MARKETS, 1938
(In thousands)

Market	Cattle	Calves	Hogs	Sheep and lambs	Total
Chicago.....	1,885	325	4,188	2,564	8,962
East St. Louis.....	848	555	2,412	988	4,803
South St. Paul	882	487	2,017	1,258	4,644
Omaha.....	1,177	121	1,214	1,648	4,160
Denver.....	541	79	290	3,135	4,045
Kansas City.....	1,334	335	376	1,506	3,551
Fort Worth.....	764	449	279	1,378	2,870
Sioux City.....	658	54	1,037	661	2,410
St. Joseph.....	310	66	675	1,011	2,062
Other markets.....	5,677	4,092	12,313	11,449	33,531
Total receipts, all markets...	14,076	6,563	24,801	25,598	71,038

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data, 1938* (Washington, May, 1939), pp. 14-15.

It is the function of these markets to provide facilities for the handling, care, feeding, weighing, and buying and selling of livestock. They serve as centralized points from which cattle may be distributed to buyers for local slaughter or shipment to the East, for distribution to feeder or stocker farms, or for export to foreign markets. Under the Packers' Consent Decree, the packers were required to dispose of their holdings in stockyards and were prevented by the restrictions of the Packers and

¹ U. S. Department of Agriculture, Miscellaneous Publication, No. 222, *The Direct Marketing of Hogs* (Washington, Government Printing Office, 1935), p. 18.

² Recognized markets are stockyards which are posted as public stockyards by the Secretary of Agriculture under the provisions of the Packers and Stockyards Act of 1921, Public No. 5, 67th Congress. See p. 103 for other restrictions imposed by this act.

Stockyards Act from operating or having a financial interest in stockyards.

In Chicago, the yards are owned by the Union Stockyard & Transit Company of Chicago, which unloads, weighs, and handles the livestock. The company does not buy, sell, or slaughter livestock, but is purely a service organization. This company takes care of the cattle from the time of their arrival until they are delivered to the buyer. The livestock usually arrives at the market between five and nine o'clock in the morning. The railroad car or truck is brought to the unloading platforms where the stockyard company unloads, counts, and assigns the livestock to the pens of the consignees. The pens are owned by the stockyard company and are allotted to the various commission firms; rent is charged the shipper on a per head basis. The commission firms sell the livestock for the producer and pay him the net returns from the sale.

The Chicago Junction Railway owns the trackage and switching facilities in the stockyards, which connect with all important railroads entering Chicago. Under a trackage arrangement with the railway, the main line railroads may deliver the livestock by operating their equipment over the Chicago Junction tracks to the unloading chutes.

The livestock commission firms were established in 1857 as the farmers' agents in the central market. At that time the only local outlet for the farmers' livestock was the local butcher, and it was necessary for the producer to accompany his cattle to the central market, to care for them, and to sell them at the best price he could get. The commission firms are located permanently in the central markets, are skilled in the techniques of these markets, and can thus effectively perform the selling service for the farmers. The commission firms are eager to get as high a price as possible, in order to retain the producer's goodwill, and to retain his business. Producers pay the commission men according to a scale set by the Packers and Stockyards Administration. Formerly these commission firms were also important agencies in the financing of livestock production.

As might be expected, some farmers were dissatisfied with the service of livestock commission firms and the rates charged. As a consequence, terminal cooperative commission agencies were established to serve the producers. The services performed are

similar to those of the privately owned firms, although in most cases surplus earnings are returned in the form of patronage dividends to the producer-owners. Some cooperatives operate on the basis of service at cost. From 1924 to 1926 in the 19 markets where terminal cooperative associations were operated, they handled approximately 16% of the receipts.¹ By 1934 agencies of these associations were operating in 33 markets, and the percentage of cooperative sales to total sales had increased to 21.8%.²

The buyers in the central market usually include: (1) the local or regional packer, purchasing for immediate slaughter for the distribution of fresh meat in a limited area; (2) the large packer with a national distribution system, purchasing either for immediate slaughter or for shipment to an eastern plant; (3) the order buyer, who is usually buying on order for outside parties such as the packer who has no local representative or plant at that market, or for the feeder or stocker purchasers; and (4) the stockman, who comes to buy his own feeders and stockers. In Chicago the cattle buyers are usually mounted on horseback and ride through the pens where the livestock is temporarily quartered. The sheep and hog buyers walk to the pens. Prices are discussed, but the deal is rarely closed on the first visit. The buyer returns after examining other lots for sale, and the deal is made verbally by individual negotiation. The dickering centers around price and grading. If a lot varies in quality, the buyers try to buy the undesirable animals "out" at a lower price. No papers are passed at the time; the buyer and seller usually carry all the details in their heads until they return to their offices. After the sale is made, the livestock is weighed by the stockyards company and sent to the buyer's pens; and if it is to be slaughtered locally, it is usually killed within two days.

The Chicago Live Stock Exchange is an organization of commission merchants operating in the market. Under this exchange rules are established by which the commission men conduct their operations. The exchange is also active in improving transportation conditions affecting producers shipping to the Chicago market

¹ U. S. Department of Agriculture, Technical Bulletin No. 57, *Cooperative Marketing of Livestock in the United States by Terminal Associations*, by C. G. Randell (Washington, Government Printing Office, 1928), p. 3.

² U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 6, *Statistics of Farmers' Cooperative Business Associations*, by R. H. Elsworth (Washington, Government Printing Office, May, 1936), pp. 66-69.

and in protecting other interests of the producers. The Chicago Traders' Live Stock Exchange is an organization of order buyers, traders, and stocker and feeder dealers, and performs the same functions for this group as the Chicago Live Stock Exchange does for the commission men.¹

A futures market for prime steam lard, dry salt bellies, and other provision items exists on the Chicago Board of Trade. With the substantial decrease in exports of lard and pork products, interest and trading volume in provisions futures have declined, but the futures trading in prime steam lard has remained active and is used as a guide for lard prices throughout the country. The only futures trading in provisions besides lard is in dry salt bellies. Trading in live hogs futures was proposed in 1930, but the idea was soon abandoned because of a general lack of interest and a feeling that it would be impractical.

The cash trading in other provisions for immediate delivery which takes place between packers and brokers is not carried on through the Board of Trade. Two privately owned price services collect daily reports on current trading for immediate delivery and disseminate the information throughout the country to packers who use these quotations as guides in setting their own prices.

The Chicago market secures the largest proportion of its supply of livestock from the adjacent states. From 1923 to 1929 Illinois, Iowa, Indiana, and Wisconsin supplied 70% of the total receipts of cattle at Chicago.² Some of these cattle did not originate in these states but were raised elsewhere, sold as feeders, and sent to market after being fattened in these states. During the same period (1923 to 1929) Illinois, Indiana, Iowa, Minnesota, Missouri, Nebraska, South Dakota, and Wisconsin accounted for 98.3% of the total receipts of hogs in Chicago.³ Practically all hogs are shipped for slaughter, although pigs and unfinished hogs are bought in local markets by farmers who plan to fatten them for market.

A substantial part of the livestock received at central markets is shipped elsewhere. Approximately one-third of the total cattle

¹ Malott, Deane W., *Problems in Agricultural Marketing* (New York, McGraw-Hill Book Company, Inc., 1938), pp. 160-164.

² University of Chicago, *Studies in Business Administration*, Vol. II, No. 1, *The Supply Area of the Chicago Livestock Market*, by E. A. Duddy and D. A. Revzan (Chicago, University of Chicago Press, 1931), p. 9.

³ *Ibid.*, p. 21.

receipts at Chicago from 1924 to 1929 were reshipped. One-quarter of the total receipts were termed "slaughter shipments" since they were destined for packing houses elsewhere. Approximately 7% or 8% of the total receipts of cattle and calves at the Chicago market during the same period were shipped out as stockers and feeders. Ninety-one per cent of these shipments moved to Illinois, Ohio, Indiana, Iowa, Michigan, and Wisconsin. Illinois, Indiana, and Michigan received 85% of the average annual shipments of stocker-feeder sheep and lambs.¹

DIRECT MARKETING OF LIVESTOCK

The increase in direct marketing of livestock has been one of the fundamental and most important trends in the industry in recent years. By direct marketing is meant the sale of livestock direct to slaughterers without the aid of commission salesmen and at places other than recognized public stockyard markets. In other words, to a greater extent the farmer has been selling his livestock directly at the country market or at the packing house. In some cases, however, the producer sells and ships to the packer located in a central market, and title passes at the packing plant, but in most cases title passes in the country at the point of origin, and the packer ships to his plant. Direct marketing has been more important in the case of hogs than in the case of other livestock.

In the 1920's the central markets constituted the final market for 70% of the cattle, hogs, and sheep.² From 1923 to 1938 the direct purchases of hogs increased from 27% to 52% of the total Federal inspected slaughter, which, in turn, constituted considerably more than half the total slaughter of the country. In the same period direct purchase of cattle increased from 11% to 25%, and the direct purchase of sheep and lambs increased from 18% to 32% (see Exhibit 9).

The direct purchase of hogs has increased more noticeably than that of other livestock because of the relatively concentrated area in which hogs are produced. Apparently hogs can be graded more easily than cattle; the farmer can tell the value of his hogs

¹ University of Chicago, Studies in Business Administration, Vol. III, No. 1, *The Distribution of Livestock from the Chicago Market, 1924-1929*, by E. A. Duddy and D. A. Revzan (Chicago, The University of Chicago Press, 1932), pp. 4-10.

² Clemen, R. A., *The American Livestock and Meat Industry* (New York, Ronald Press Company, 1927), p. 539.

EXHIBIT 9
DIRECT PURCHASES OF LIVESTOCK IN PER CENT OF TOTAL SLAUGHTERED
UNDER FEDERAL INSPECTION*

Year	Cattle	Calves	Hogs	Sheep and lambs
1923	11.1	14.3	26.5	18.1
1924	11.6	16.0	27.4	20.4
1925	11.7	15.6	28.3	20.8
1926	12.0	17.7	31.2	18.5
1927	11.8	17.0	32.7	15.5
1928	12.2	16.3	35.0	15.3
1929	12.9	18.1	40.5	16.1
1930	13.9	20.1	40.0	16.4
1931	14.9	22.6	43.4	18.7
1932	17.7	27.1	45.7	21.2
1933	18.6	28.4	46.9	23.2
1934	19.8	29.6	45.2	26.2
1935	18.9	27.6	47.4	25.8
1936	20.5	29.6	48.1	27.8
1937	22.5	33.7	48.6	32.9
1938	25.1	35.8	51.7	31.6

* Balance of Federal inspected slaughter purchased at public stockyards.

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data, 1938* (Washington, May, 1939), p. 34.

more readily than he can that of his cattle. Furthermore, as previously pointed out, there are few stocker and feeder purchases of hogs, since practically all hogs are sold for slaughter, and consequently there is no need for them to be shipped through central markets to other localities for fattening purposes. With the establishment of local pork packers at interior points, a demand for hogs at country points developed. From evidence gathered by government agencies and statements made at public hearings, it appeared that central market packers did not begin to do any large volume of business by direct purchases until after receipts of hogs at central markets had declined sharply, and slaughter at interior markets had increased steadily.¹

The freight differentials and shipping privileges granted by the railroads have been an important factor in the marketing of hogs and in the establishment of pork-packing plants at interior points. On the majority of shipments which originate in the Corn Belt and move east, the freight cost of shipping a hundredweight of hogs is higher than that for the dressed pork products secured from

¹ U. S. Department of Agriculture, Miscellaneous Publication, No. 222, p. 10. Some other packers had been buying direct for a number of years. One of these is John P. Squires and Company of Cambridge (a Swift & Company subsidiary) which has had its own buyers at interior points in Iowa and Illinois since 1903.

the same hundredweight of hogs. This differential has been in effect for some time and has encouraged the establishment of packing plants at various points in the Corn Belt. Such plants usually buy direct, and thus the freight differential has no doubt been a factor in the increase in the direct marketing of hogs.

The shipping privileges, particularly the privilege of assembling, grading, and reassignment to cars which is permitted at concentration yards, have also resulted in the increase in direct purchases by the packers. Hogs shipped through such concentration yards are charged the through rate from the point of origin to their destination, and this rate is lower than the combined rate from the point of origin to the concentration yards plus the rate from the concentration yards to the destination. Thus packers may buy at the concentration yards and secure the benefit of the through rate to their packing plants.¹ The increase in the number of concentration yards coincided with the increase in direct marketing. In 1920 there were 19 concentration yards in the western Corn Belt. This number had increased to 54 in 1927 and to 195 in 1933.²

The Chicago Live Stock Exchange was opposed to these freight differentials and privileges, and protested to the Interstate Commerce Commission in 1936, alleging that the rates were unreasonable, unjustly discriminatory, and gave preferential treatment to other local and terminal livestock markets. The exchange also complained that the differential between fresh meats and packing-house products and rates on fat livestock were discriminatory. These complaints, along with the complaint that rates on stocker and feeder cattle and lambs were prejudicial to the Chicago livestock market, were included in three cases heard before the Commission; all pleas were denied by the Commission and no changes were made.³

The increasing use of motor trucks as a means of transporting livestock has also encouraged direct buying. Producers have found that shipping by their own trucks or by contract truckers involves less loss of time and less shrinkage during the journey.

¹ *Ibid.*, pp. 74-75.

² *Ibid.*, p. 76.

³ ICC Docket No. 26717, *The Chicago Live Stock Exchange, Complainant, v. Abilene and Southern Railway, et al., Defendants*; ICC Docket No. 27149, *The Chicago Live Stock Exchange, Complainant, v. Alton Railroad Co., et al., Defendants*; ICC Docket No. 24847, *The Chicago Live Stock Exchange, Complainant, v. Atchison, Topeka and Santa Fé Railway Co., et al., Defendants*.

The truck is more flexible in meeting the needs of the shipper both as to time and as to size of the shipment. In 1937 over 50% of the cattle and calves, 66% of the hogs, and 27% of the sheep received at public stockyards were shipped by truck.¹ In the local markets the truck is also used extensively. In recent years this means of transportation and the widespread and prompt dissemination of market quotations have speeded up the marketing of livestock.

The additional advantage to the farmer in marketing direct is the fact that he saves the stockyards and commission charges which would have to be paid if the livestock were shipped to public stockyards.

There has been considerable controversy over the extension of direct marketing. Central market packers were disturbed by the reduction in supplies coming to their markets; farmers were worried as to whether or not they were receiving fair prices; and the commission merchants were fearful of the future because the volume of business in the central markets was declining. The investigation by the Department of Agriculture in 1935 resulted in conclusions that direct marketing did not restrict competition among slaughterers and distributors, but rather that prices were probably more accurately determined than previously.²

As might be expected in such a situation, there were many who disagreed with this conclusion, and those who were most adversely affected were the most vociferous. Mr. S. P. Houston, a member of the United States Livestock Association, wrote:

. . . decentralization of the marketing system must of necessity increase marketing costs, and whether such expense be an itemized deduction from a sale or not, the farmer pays it in the long run. . . . The direct system further endangers the farmer since it forces him to pit his inexperience against the long experience and thoroughly cultivated skill of the trained and intimately informed packer buyer. . . . the result of local market operation has been to weaken the general level of hog prices.³

Mr. J. H. Mercer, secretary of the Kansas Livestock Association, testified that insufficient competition in the local markets reduced the price:

¹ U. S. Department of Agriculture, *Livestock, Meats, and Wool Market Statistics and Related Data*, 1937, pp. 14-15.

² U. S. Department of Agriculture, Miscellaneous Publication No. 222, p. 21.

³ *United States Live Stock News*, Vol. 2, No. 1, March, 1935, p. 3.

We have quite a bit of competition, especially on our larger markets. . . . There is competition there, and we have a chance to go to one person and if we are not satisfied, to try another. But out here in the country at these assembling points we have no voice . . . in the price.¹

Mr. Knute Espe, secretary of the Iowa Cooperative Livestock Shippers, took the other side of the argument:

We have had the fiercest competition in our State for direct hogs, and we feel that it has boosted the price level, if anything. . . . If all this livestock that we sell direct was sold through the Union Stockyards in Chicago, the extra cost of marketing, in commissions, yardage, and feed, would have amounted to the staggering sum of \$3,258,906.²

Mr. Jay Hormel of George A. Hormel & Co., interior packers located at Austin, Minnesota, stated:

. . . my attitude is that the terminal markets are slipping because of the fact that the producers are realizing that they can sell their hogs just as well without the extra services which the terminal market affords them, and they are getting less and less willing to pay that price. . . . The type of buying that is done by the direct buyer, who is near his source of supply and knows something about the animals before he sets his eyes on them, is much fairer than anything that can be done in any other way.³

This controversy reveals that these fundamental changes in the marketing of livestock caused considerable business readjustment. Central market packers were forced to buy direct to secure an adequate supply, and livestock commission firms in the central market found it necessary either to establish branches or to face declining volumes of business. The increase in truck transportation and the shorter hauls to the interior packers meant less revenue to the railroads. It was a shift dictated by economic necessity, just as conditions in early years required large central markets where producers could be assured of a representative market and where large packing plants were required in order to absorb the daily receipts.

GROWTH OF THE MEAT-PACKING INDUSTRY

Although livestock has been slaughtered for meat for many centuries, the meat-packing industry as such did not become

¹ Hearings before the Committee on Agriculture and Forestry, United States Senate, Seventy-third Congress, Second Session, on S. 2135, S. 2621, and S. 3064. Bills to amend the Packers and Stockyards Act, 1921 (Washington, Government Printing Office, 1934), p. 104.

² *Ibid.*, pp. 211, 214.

³ *Ibid.*, pp. 238, 241.

important until the nineteenth century. Until that time the local butcher or slaughterer produced meat primarily for local consumption. As the population of the country moved westward, there developed specialized businesses which concentrated on the slaughter and packing of livestock, particularly of hogs. These early packing plants were located along the Ohio and Mississippi Rivers. With the extension of the railroads, packing houses were established at junctions or other points where supplies could be received and products shipped by rail. Except for local needs the packers of this period produced nothing but cured and salted meats until the science of refrigeration was developed to a point where meat could be kept safely in storage. The first mechanical refrigerator plant in the United States was installed in the Chicago packing houses in 1880, although previously natural ice had been used for cooling and some meats had been frozen.¹ Refrigeration solved the problem of storing meats in the warehouses, but the problem of refrigerated transportation remained. The earliest attempts to refrigerate freight cars were made in the early 1860's, but the equipment was not perfected and no substantial amounts of dressed beef were shipped by this method until the 1880's.²

In 1875 two men, destined to become important figures in the packing industry, arrived in Chicago—Philip D. Armour, founder of Armour & Company, and Gustavus F. Swift, founder of Swift & Company. Armour had spent five years in the California gold fields in the 1850's, and had made and saved \$8,000 from a contracting business. In 1859 he used his savings to establish, in partnership with F. B. Miles, a grain, produce, and commission business in Milwaukee. In 1863 Armour formed there a new partnership with John Plankinton, and began to slaughter and pack beef and pork. This business prospered, and branches were established in Chicago and Kansas City; his brothers were appointed as managers. In 1875 Philip Armour himself moved to Chicago.

At the age of 20 Gustavus F. Swift was the proprietor of a local butcher shop in Eastham, Massachusetts, on Cape Cod, and soon became, in addition, the local cattle dealer.³ The cattle business was expanded, and a partnership was formed with Henry Hath-

¹ Clemen, *op. cit.*, p. 216.

² *Ibid.*, pp. 216-221.

³ From *The Official History of Swift & Company* as reported by executives of the company.

away who owned a local dressed-meat business in Boston. Swift took charge of the buying; in 1875 he went to Chicago as a cattle buyer for his firm. Shortly afterwards he purchased a slaughterhouse there, and started his career as a packer.¹

Both Swift and Armour were influential in the development of the refrigerator cars. The importance of the development of the refrigerator car cannot be overemphasized. Such transportation facilities for shipping fresh meats were needed, not only to permit the expansion of the packing plants but also to absorb the increasing amounts of cattle being shipped from the range country. The refrigerator car meant that the consuming areas could be supplied with fresh meats, and thus demand for the product of range and farm was increased.

Swift & Company began to ship refrigerated dressed beef east in 1877. It had been necessary for the company to build and supply its own cars. The railroads had refused to handle the shipments because a very large investment would have been required to secure an adequate supply of refrigerator cars. The railroads had already made a large investment in local stockyards throughout the country and also in cattle cars which could be used for other purposes on the return trip to the West. Local butchers were antagonized by the encroachment on their market made possible by the use of refrigerated cars, and the public believed that chilled beef was unhealthy and unpalatable.

The increase in the size of the packers, while advantageous from a business point of view, was the forerunner of considerable trouble and criticism that has continued to the present day. The distribution mechanism of the packers was investigated by the Senate as early as 1888, when cattlemen and butchers were disturbed by the growth of the large packers. While there was no specific indictment, the impression given by the Senate committee was that such a combination was not advantageous to the public. A few years later the so-called "Veeder pools,"² which were used to prevent gluts of supplies on the markets, were the subject of investigation. In 1902 the Attorney General of the

¹ Clemen, *op. cit.*, p. 161.

² These pools limited shipments and purchases to a set percentage by agreement between the Armour, Swift, and Morris packing companies. Henry Veeder, of Swift & Company, acted as secretary and statistician of the group, which met once a week to apportion the volume of business of each packer. U. S. Federal Trade Commission, *The Meat Packing Industry*, Summary and Part I (Washington, Government Printing Office, 1919), pp. 46-47.

United States filed a bill against the packers for having entered a combination to suppress competition. This bill was one of several in President Theodore Roosevelt's "trust-busting" campaign. A grand jury indicted the packers in 1905, but the Supreme Court of the District of Columbia granted individual defendants immunity from criminal prosecution on the basis of the packers' claim that they were forced to give evidence against themselves to the Commissioner of Corporations who was investigating the packers and their operations at the same time. The government dismissed the case against the corporations, not caring to prosecute them without the individuals. The public was astounded by this "immunity bath," and the opinion that the packers were a monopoly exploiting the public continued to prevail. The report of the Commissioner of Corporations did not justify this conclusion, for it stated that the profits of the packers were not excessive.¹

The public and the government were also interested in the sanitary practices of the packers, partly because of the general distrust of chilled beef which existed at the time when refrigerator cars were introduced. The first Federal law directly affecting the meat-packing industry concerned inspection, and was passed primarily to comply with foreign laws concerning sanitary requirements as to meat imported into foreign countries. This law was extended in the following year, 1891, to include the Federal inspection before slaughter of all meat which would pass through interstate commerce and which was intended for human consumption. After the "muckraking" articles of 1905 and the publication of such books as "The Jungle" by Upton Sinclair, an act was passed to extend Federal inspection to meats and meat products in all the stages of processing, curing, and canning. This act was applied to all meat and meat products which entered into interstate commerce.

Part of the general ill will arose from the fact that the National Packing Company had been formed in 1903 by the three largest packers: Armour, Swift, and Morris. Trusts were being formed in every field at that time, and the public and the government made a great protest against monopolies. The government sought an indictment of the National Packing Company in 1910

¹ U. S. Commissioner of Corporations, *Report on the Beef Industry* (Washington, Government Printing Office, 1905), pp. 258-269.

for violation of the Sherman Antitrust Act. The government charged that the combination was suppressing competition and controlling prices, since the three largest packers, supposedly in competition with one another, controlled this concern. Although the jury rendered a verdict of "not guilty," the public continued to believe that monopoly prices were being charged by the packers. The National Packing Company had not been a financial success, however, and shortly after this suit it was voluntarily dissolved.

The tremendous activity in the meat-packing industry during the World War and the profits that resulted from these operations made packers the target for another investigation. This time they were subjected to the scrutiny of the Federal Trade Commission. The result of this investigation was an elaborate report on all phases of the meat-packing industry.¹ The report not only condemned the packers in no uncertain terms, stating that a monopoly existed which suppressed competition, but it made recommendations as to the way in which this monopoly could be broken. The Commission's hearings were *ex parte*, however, and the general opinion of impartial observers seemed to be that the report was biased.² The commission criticized such normal activities as the control of branch houses by headquarters offices,³ and recommended that the government take over these branch houses.⁴

As a result of this investigation the packers agreed to give up their interest in public stockyard companies and stockyard terminal railroads. They agreed, further, to refrain from engaging in any distribution of food produce and groceries unrelated to the meat-packing industry, from selling meat at retail, from holding an interest in any public cold storage plant, and from selling fresh milk or cream.⁵ These agreements were essentially the terms of

¹ U. S. Federal Trade Commission, *Report on the Meat Packing Industry* (Washington, Government Printing Office, 1919).

² See McFall, R. J., *The World's Meat* (New York, D. Appleton-Century Company, Inc., 1927), pp. 559-560; also FitzGerald, *op. cit.*, p. 177. The Federal Trade Commission was under pressure from the public to stamp out "profiteering" because of the sharp increase in prices of food products and particularly meat prices during the war. It was, therefore, difficult for the investigation to be completely unprejudiced and unbiased, since the decision had already been rendered by the public at large before the investigation was made, and the representatives of the government were eager to reflect this opinion.

³ U. S. Federal Trade Commission, *The Meat Packing Industry*, Summary and Part I, p. 42.

⁴ *Ibid.*, p. 26.

⁵ Donovan, W. J., and McAllister, B. P., "Consent Decrees in the Enforcement of Federal Anti-Trust Laws," *Harvard Law Review*, Vol. 46, No. 6, April, 1933, p. 887.

the famous "Packers' Consent Decree." Although the packers agreed to these restrictions, the decree expressly stated that it did not constitute an adjudication that the defendants had violated any law of the United States.

A few years later the packers attempted to have the Consent decree voided, on the grounds that it was beyond the power of the court to impose penalties under the antitrust laws when the decree stated that it did not pass judgment on whether or not any law had been violated; that, therefore, the decree deprived the defendants of property without due process of law; and, further, that the decree itself violated the antitrust laws by eliminating the competition of the packers. The United States Supreme Court denied the motion to vacate the decree, on the ground that an injunction might issue to prevent future wrongs, though no right had yet been violated,¹ and reinstated the decree which had been suspended from 1925 to 1929.² Subsequently, in 1931, a plea for modification of that part of the decree having to do with foods unrelated to meat was granted by the Supreme Court of the District of Columbia. The packers had insisted that changing conditions had made it necessary for them to protect their competitive position. The United States Supreme Court, however, reversed this decision.³

The changes referred to by the packers were economic movements beyond their control, which represented developments since the time of signing the Consent Decree. The increasing number of chain stores, the establishment of packing companies by these stores, and the changes in distribution of food products had resulted in increased competition from a new direction. At the same time there had been an increase in the number of small packers whose activities were not restricted as were those of the larger packers.⁴

Another result of the Federal Trade Commission's investigation was the enactment in 1921 of the Packers and Stockyards Act.⁵ This act empowered the Secretary of Agriculture to supervise and control the packers, stockyard companies, and commission men. For the most part the act was intended to prevent

¹ *Swift & Company v. United States*, 276 U. S. 311, 48 S. Ct. 311.

² *United States v. California Cooperative Canneries*, 279 U. S. 553, 49 S. Ct. 423.

³ *United States v. Swift & Company*, 286 U. S. 106, 52 S. Ct. 460.

⁴ Fewster, J. D., "The Packers' Consent Decree," *Harvard Business Review*, Vol. 8, No. 3, April, 1930, p. 350.

⁵ Public No. 5, Sixty-seventh Congress, 42 Stat. 159.

the control of prices and prohibit monopoly. The packers were prohibited from engaging in "unfair, unjustly discriminatory, or deceptive practice or device in commerce," from apportioning supplies and territories for carrying on business, and from manipulating or controlling prices. The act also established rules and regulations for the conduct of stockyards and the business of commission merchants.

PURCHASE AND SLAUGHTER OF LIVESTOCK

The wide variation in numbers of livestock arriving daily at the public stockyards and in local markets where packers purchase direct increases the difficulty in coordinating purchases to meet the demand and in securing a supply of the arrivals sufficient to maintain a relatively stable rate of operations in the packing houses. Consequently, the purchasing activities of the packers are not functionalized, but are conducted on a product basis. The large packing concerns are usually organized into four product departments: (1) beef, (2) lamb and sheep, (3) veal, and (4) pork.¹ Each of these departments usually has a sales manager and a chief buyer whose activities are closely coordinated. This coordination is necessary since the price bid by the buyer in the markets is determined by the current and probable future retail demand for meat, which is measured by the volume of meat of different types being sold at varying price levels.² It is important that the volume of livestock purchased and the volume of meats sold be kept in line with each other, both from the standpoint of price and from the standpoint of volume, since large quantities of meat cannot be stored for long periods but must be moved into channels of consumption for whatever price can be secured. Because the various meat products compete with one another, the packers have found it necessary to coordinate closely the purchases and sales of each product. Under the chief buyer for each type of livestock are head buyers in each of the principal markets where the packers purchase their supplies. If the company's size justifies it, there are assistant buyers acting under the orders of the head buyers, specializing in particular grades and types of animals purchased by their departments.

¹ Malott, *op. cit.*, p. 333.

² For a further discussion of prices paid for livestock and the relation to consumer demand, see p. 114.

THE LIVESTOCK AND MEAT-PACKING INDUSTRY

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The meat packer performs what is essentially a breaking-up process. The functions of the packer may be divided into four general classifications: (1) the slaughter of livestock, the dressing of the meat, curing, processing, and canning; (2) the specialized manufacture of by-products, such as hides, glue, fertilizer, and soap; (3) the storage of perishable and nonperishable meat products; and (4) the distribution of meat and meat products, including jobbing and operating branch houses and warehouses.

Federal inspectors examine the livestock at various stages of the "disassembling" process to discover any animals deemed unfit for consumption. These inspectors form a large staff in the larger packing plants. In one plant slaughtering at the rate of 7,000 hogs weekly, there are 12 to 14 Federal inspectors regularly on duty. The first inspection takes place before slaughter, and any livestock suspected of being unsatisfactory or unsafe for human consumption is eliminated from the lot. After the animals are passed by Federal inspectors, the livestock proceeds by runways into the packing plant and to the killing floor. The process of slaughter varies only slightly for the different animals; the following description of cattle slaughter and butchering may be taken as typical. On the killing floor cattle are herded into "knocking pens." The "knocker" walks along the runway above the cattle and strikes each animal on the head with a long-handled hammer. The animals are then hoisted by the hind feet and hung from the rack of an overhead trailer. Their throats are cut and they are bled. Then a series of skilled butchers, each performing one dissection operation, proceeds to cut up the animals. When cattle or sheep are destined for the kosher trade a "shohet," who is officially licensed by rabbinic authority, cuts the throats of the animals and supervises the dissecting operations in order that the meat may be certified as strictly kosher. At each stage where vital organs can be easily examined a Federal inspector investigates for any evidence of disease. Since it is difficult to detect disease before purchase, the condemned animals which are sent to the "tank," the product of which is used only for fertilizer and feeds, are a financial loss to the packer. After a period of extreme cold and unfavorable weather, when the number of hogs condemned because of cases of tuberculosis or pneumonia increases, the loss to the packer in terms of dollars is important.¹

¹ In the case of hogs the loss averages approximately one-half of 1% of live animals.

Rec. No. 14727.

The sides of beef resulting from the slaughter are then "shrouded," or clothed in a cheesecloth which has been soaked in hot water and is then stretched over the carcass. The cloth draws out the blood from the covering of fat and leaves it an attractive creamy white. The beef is then chilled at 32 degrees to 34 degrees Fahrenheit for from thirty-six hours to forty-eight hours before distribution to the branch houses. This chilling process removes the animal heat and causes the meat to "set," in other words, to become firmer and adhere to the bones. Fresh pork is usually held in the coolers only 24 hours, or long enough to remove the animal heat, since pork has a better flavor when fresh. Pork to be cured must be held in the cooler longer, since pork not thoroughly chilled tends to sour around the bones when placed in cure.

As has been pointed out, a number of products are produced from the slaughter of one animal. Approximately 60% of the original live weight of a hog can be sold in the form of the most important cuts of meat or rendered lard; the remaining 40% consists of minor meat products and by-products, or shrinkage and waste.¹ Approximately 55% of the live weight of a steer can be sold as beef; the remainder of the weight consists of by-products such as hides and fats, or waste and shrinkage.² All the meat does not move directly into channels of consumption, and packers estimate that only 30% of the live weight of the hog is sold as fresh meat, the remainder being used in processed products.³ Because of the seasonal variation in numbers of hogs sent to the central markets, there is considerable variation in the amount of hog products in storage. The peak slaughter of hogs is between November and March, and during this period large quantities of frozen and cured meat are placed in storage to be used to supplement the light production of the summer months. Usually the pork products are stored for only two to four months, and they are very rarely stored for longer than twelve months; the hog slaughter of one year is moved out of storage before the peak of

¹ Senate Document No. 184, Seventy-second Congress, Second Session, *Economic Situation of Hog Producers* (Washington, Government Printing Office, 1933), p. 76. The yield of edible products is estimated at approximately 75% by several packers.

² Clemen, R. A., *By-products in the Packing Industry* (Chicago, University of Chicago Press, 1927), p. 10.

³ This figure varies, of course, between packers. At eastern packing plants, where the specialty is fresh pork for local or regional consumption, the percentage of live weight sold as fresh meat will run as high as 35% to 40%. One of the large middle western packers estimates that 40% of the hog carcass (not of the live weight of the hog) is sold fresh, 40% is cured, and a little less than 20% is lard.

storage consignments is reached during the following year. Some packers consider five months as the maximum storage period for cured pork products, particularly for bacon, since its milder cure is more conducive to mold and deterioration.

There are three principal types of cure for pork products: (1) the sweet pickle, (2) the dry salt, and (3) the dry cure. The sweet pickle consists of a pickling fluid of water, salt, sugar, and saltpeter. This cure is principally used for hams.¹ The dry salt cure is used principally for fat-back and heavier, coarser grades of bellies. This process consists essentially of rubbing the meat with dry salt and storing it in stacks or piles. High-grade bacon is the principal product for which the dry cure is used. The bacon is rubbed with a mixture of salt, sugar, and saltpeter, and then packed tightly in metal boxes to draw its own pickle and to cure. After curing, the hams and bacon are smoked over hardwood fires. Frozen pork is usually sold to brokers and wholesalers in frozen form and always sells at a price discount.

Curing and storage are less important for beef than for pork products. Corned and dried beef are the principal types of cured beef. Some beef, usually less than 5% of the carcass, and consisting principally of trimmings and meats for sausage, is frozen and can be kept in storage for a period of several months. The volume of cured and canned beef is usually less than 7% of the total handled.²

The nonedible products of the animals are distributed to the various processors of by-products, many of which are subsidiaries of the packers. Hides are the most important of the by-products. The hide accounts for approximately 8.6% of the total return from a steer as compared with 4.1% returned from all other by-products and 87.3% from the meat. The return from the sheep pelt is relatively higher, amounting to 14.5%, with the return from the other by-products of 4.1% and the return from the meat of 81.4%.³ Some of the by-products, such as lard, oleo

¹ A new process of curing hams has been developed in recent years, known as vein pumping. Pickle is forced into the circulatory system through the main artery. The hams are then held in pickle, but the curing time is less than half that of standard cured hams. Advantages of this process, according to those who use it, are the increased gain in weight in curing, and increased tenderness.

² Most of the canned corned beef consumed in this country comes from South America, where cattle are cheaper and where the entire carcass is used for canning, rather than just the cheaper cuts; the product is therefore of higher quality.

³ Clemen, *op. cit.*, p. 9.

oil, stearine, and the pharmaceutical products, are edible. Other important livestock by-products are glue and gelatin, feeding tankage, fertilizer, glycerin, wool, hair, and soap.

One of the largest industries built upon the by-product business of the packing houses is the leather industry. Leather tanning has been performed in this country since colonial days, and the industry not only uses all the production of this country but imports substantial quantities of hides each year from Argentina. The principal use of the leather produced by this industry is for shoe soles, welting, and uppers. The other important use is in belting for power transmission. The large packers have established subsidiaries to process leather.

From the description of the meat-packing process, it is apparent that the big packing companies at the central markets must maintain a large labor force and storage space. In order to make the most effective use of their facilities they require a steady supply of livestock daily. One of the great problems of the market is that there is no way to control the supply coming to market other than through the price bid for arriving livestock, which is broadcast to all shippers. The supply varies by days in the week and by seasons of the year. For example, the largest supply of cattle arrives at central markets on Monday. The receipts on this day of the week usually total at least 25% to 30% of the week's receipts. The supply is small on Friday and negligible on Saturday. The receipts of hogs are more evenly distributed throughout the week than those of cattle. More hogs are received in the earlier part of the week, but the volume is maintained through Friday, although Saturday receipts are substantially lower. In country yards and receiving points, however, receipts on Saturday are frequently the heaviest of the week.

The seasonal variation is also wide, since 35% of the year's total of cattle usually arrives in the three months of September, October, and November. Naturally, retail demand does not vary with the supply of cattle reaching the market. It is, of course, impossible for the packer to hold in storage the cuts which are to be sold as fresh meat. Fresh pork can be frozen, but it usually brings a lower price than pork which has not been frozen. Consequently, a packer freezes products only when price levels are low enough to give promise of inventory appreciation. As a

result, the receipt of a large supply of livestock when the retail demand for meat is not keen brings about relatively lower retail prices and, of course, lower prices to livestock producers.

This variation in the receipt of livestock creates a difficult operating problem for the packer. He must maintain equipment, facilities, and a labor supply large enough to process the peak receipts. When receipts are low, overhead costs per unit are high, the labor force is not used intensively, and the costs of maintaining the excess capacity must be borne by the packer. For this reason packers are particularly interested in maintaining a steady supply of livestock and in purchasing their normal proportions of the day's arrivals. The only control over the receipts which the packer can hope to exert is by the prices he bids, and of course these prices are determined to a great extent by the retail price level of meats. This dilemma of the packers has been, of course, intensified by the declining receipts at central markets resulting from the increase in direct buying and marketing at interior points.

Some indication of the magnitude of the problem of adjusting operations to a fluctuating supply can be secured from an analysis of the purchases¹ of livestock at several central markets by the principal packing companies. In Chicago, the purchases of Armour, Swift, and Wilson have averaged 25% of the total receipts during recent years and reached a peak of 40.3% in October, 1937. In St. Louis, the average percentage is higher, amounting to 30% to 35% for Armour and Swift, the two companies operating packing plants there. In Kansas City all four of the largest companies, including Cudahy, have plants; the proportion of purchases to total receipts purchased by each of the four companies for a period of 17 weeks in 1937 is shown in Exhibit 10. The corresponding figures for Omaha and South St. Paul are slightly higher. The remainder of the livestock is sold to other local packers, or shipped out to other packers or as stockers and feeders.

The relative stability of these purchases in percentage of total receipts in the market bears out the point that the companies attempt to secure their proportionate share of the arrivals.²

¹ As reported by *The National Provisioner*, the trade publication of the meat-packing industry.

² The necessity of using the plant and equipment as much as possible to reduce overhead costs makes it important for the packers to maintain their position in the

While this proportion remains roughly the same, and comparisons of similar weeks and other weeks in preceding years do not show important variations, the actual volume of purchases fluctuates considerably. This volume is of importance in measuring the extent of the problem because it is the number of cattle purchased and slaughtered which affects operating costs and size of the labor force.

EXHIBIT 10
PERCENTAGE OF TOTAL LIVESTOCK RECEIPTS IN KANSAS CITY
PURCHASED BY FOUR COMPANIES, SEPTEMBER 4, 1937, TO
DECEMBER 25, 1937

1937 Week ending	Armour	Swift	Wilson	Cudahy	Total four companies
Sept. 4	14.75	12.20	9.51	11.48	47.94
11	17.60	13.26	11.15	12.35	54.36
18	16.94	13.27	9.65	11.93	51.79
25	13.55	9.79	10.20	10.33	43.87
Oct. 2	15.82	13.75	10.53	12.95	53.05
9	14.47	9.93	10.38	10.97	45.75
16	13.05	10.83	9.29	9.41	42.58
23	13.74	10.19	11.14	9.09	44.16
30	14.68	9.68	10.46	10.54	45.36
Nov. 6	15.56	12.08	11.86	12.32	51.82
13	14.36	11.20	10.92	9.48	45.96
20	15.29	10.17	9.26	10.37	45.09
27	13.95	9.71	6.12	9.89	39.67
Dec. 4	15.06	11.92	8.77	12.03	47.78
11	19.64	12.64	8.22	13.86	54.36
18	17.18	11.22	8.23	12.42	49.05
25	21.10	13.82	12.26	14.47	61.65

Source: Computed from data in *The National Provisioner* and U. S. Department of Agriculture Reports.

A rough measure of the "percentage of capacity" operations is the relation of a week when receipts are small to the average of the three highest weeks, under the assumption that the plant is operating at approximately 100% of capacity at the peak. The plants obviously must be of such size that the livestock can be slaughtered promptly even in weeks of heaviest shipments to the market.¹ Considering the average of the three highest weeks

market; otherwise another packer might secure a competitive advantage by operating at a higher capacity and thus securing lower unit costs.

¹ From a statistical point of view the data have three limitations: (1) the cost of slaughtering of one unit of one type of livestock is not always the equivalent of a single unit of another type; (2) each packing plant has a separate capacity for hogs,

as 100, purchases by Armour in the Kansas City market in 1937 ranged from 39.5 to 109.5; comparable low and high figures for Cudahy were 36.4 to 103.5; for Swift, 37.2 to 109.0; and for Wilson, 29.2 to 112.6.¹ It is interesting that the low points for each of the companies did not come in the same weeks, and the high points of only two of the companies coincided.

While a solution to this problem of varying receipts in the central markets would be desirable for the packers, it apparently is not forthcoming. Producers and their representatives will probably continue to ship either when they feel that they have to or when they think the market is right, and it appears highly unlikely that efforts of the packers to stabilize receipts will be successful. As a consequence, packers will probably find it necessary to continue their efforts to adjust operations as efficiently and economically as possible to the arrivals in the market.

MARKETING OF MEAT PRODUCTS

The distribution of meat products requires as large an organization of the packers and as much expense as the manufacturing and processing functions. The meat supply of the nation, except for the slaughter by local butchers, is the responsibility of the packers, and, of course, their business progress depends upon their ability to merchandise their products. This function of the packers is of great importance to the producers, since the consumption of various types of meat determines in part the price which will be paid for the producers' livestock.

It has been pointed out above that the packers were not national distributors until the development of refrigerated storage space and refrigerator cars. With the development of such transportation facilities, dressed beef was shipped to the East, and an efficient distribution system became necessary for the handling of the meat after its arrival. Armour & Company first shipped dressed beef to local consignees, but this system soon proved to be unsatisfactory. The consignees were unable to make reasonably accurate estimates of their requirements; the meat was not properly handled; and a more aggressive selling system was necessary

sheep, calves, and cattle, although sheep and calves are interchangeable; (3) the shipments by these purchasers to other markets are not taken into account, since no data are available. On the other hand, all packing-house shipments are for slaughter, and therefore the receipts of livestock affect the operations of some plant.

¹ Computed from data in *The National Provisioner*.

to overcome public antipathy to chilled beef. For these reasons Armour & Company established branch houses with salaried managers. Swift & Company and Morris & Company later established similar branches.

The typical branch house of a meat packer is a combination warehouse, wholesale market, and refrigerator. Each branch house is usually on a railroad siding and also has truck-loading platforms. Carloads of packing-house products arrive at the rate of from one a week to two or three a day, depending on the size of the market served. Each house has a manager who works on salary. Some products are purchased on a definite price basis while others, usually carcasses, are handled on a commission basis; the commissions are applied to pay for operating the house. In this way responsibility is placed on the manager to make the branch house "pay." At some of the branch houses meats are smoked, bacon is sliced, hams are boiled, and sausages are made. Branch houses sell to local distributors, wholesalers, and institutions. The branches have a weekly peak of business when sales and deliveries are made to retail establishments for the week-end trade. One regional packer estimated that one-third of the week's deliveries were made on Friday and that half of the weekly retail sales were made on Friday and Saturday.

At headquarters the sales organization of a meat-packing company with a national distribution system is usually divided on a product basis. Each product, such as beef, pork, lamb and mutton, veal, canned meats, hides, or soap, has its own sales department in the office at headquarters. These departments maintain direct communication with the branch houses, and the main sales office keeps in close touch with the buyers in the central market in order that the latter may bid for livestock arrivals at a price which reflects the retail demand. The company's salesmen, working out of the branch house, sell the entire line of the company and are supplemented by men specializing in one product or another who are responsible to the headquarters office. The "general line" salesmen call on the retail outlets, institutions, and jobbers. Brokers are important only in the larger cities, and usually their principal customers are jobbers.¹ The broker

¹ Brokers serve as intermediaries between packers, or between packers and large buyers on carload sales. The sales department of the headquarters office deals with these brokers directly.

charges a commission of 10 to 25 cents a 100 pounds of meat, according to the product, and has only a small office force. The jobber is more important in the marketing structure and sells to the retail outlets.¹

In less heavily populated areas the packers sell to retailers by "route cars," formerly called "peddler cars." These refrigerator cars follow definite routes on previously established schedules, delivering orders which the company's salesmen have secured. There are usually about 20 towns on each route. The refrigerator cars are loaded at the packing plant or large branch warehouse and routed through the towns in succession until they return to the plant for reloading on another trip. The orders are packed into the cars in the order of delivery; the orders for the first town are placed nearest the door, the orders for the second town behind these, and so on. This arrangement not only facilitates the unloading but also means that the doors of the cars are open for a minimum amount of time.

Improved highways and the increased use of trucks have, of course, reduced the importance of the route car in the distribution system. Delivery by refrigerated motor truck, however, is limited to a radius of approximately 100 or 150 miles from the plant.

Most of the meat-packing companies also handle butter, eggs, cheese, and poultry. The refrigeration and distribution facilities for the handling of meat products are utilized to handle produce, which is sold through the same outlets as meat. Some of the companies own and operate creameries for the manufacture of butter, and maintain plants where poultry is fed and dressed, and where eggs are collected and graded.

Recently in small communities a growing number of refrigerator locker plants have been established where farmers and residents can store country dressed meat and other perishables. Many of these plants are remodeled ice plants or warehouses which are used for this purpose to increase the income of the local owner. It was estimated that in 1936 there were in this country between 1,000 and 1,500 refrigerator locker plants.² The possible growth of such plants is a threat to some of the packers' car

¹ The jobbers are roughly comparable to branches and sell direct to retailers, restaurants, and hotels. Generally they cover a restricted market although in some places they serve the same purpose as a branch.

² Malott, *op. cit.*, p. 279.

routes, but in the present early years of development the packers' urban trade has not been affected to any great extent.

RELATIONSHIP BETWEEN THE CONSUMPTION OF MEAT AND THE PRICES OFFERED BY PACKERS

Since the principal product of the packing houses is meat intended for human consumption, the demand for these meat products is subject to all the variations resulting from the different tastes of consumers. Religion, geographical location, custom and habit, temperature, and, most important of all, consumer income and purchasing power, determine the demand for meat products. This demand, in conjunction with the varying supplies of livestock coming to market, is of major importance in setting the price for retail meats, and this price in turn indicates to the packers how much they can pay currently for the livestock to be slaughtered. The promptness with which price adjustments may be made to varying supply and demand depends on keen analysis and intelligent forecasts, but sometimes prices of fresh meat may vary widely within a limited period of time because of local conditions.

The various meat products compete with one another as well as with other foods. As may be seen in Exhibit 11, the per capita consumption of meat products has been declining in recent years. In any particular year the per capita consumption of a certain meat will depend in part on its price in relation to the prices for other meat products and substitutes. For example, in 1935, the prices of pork products were more than double what they were in 1933, whereas beef and lamb prices did not increase so substantially; consequently the per capita consumption of pork was below average. These prices reflect the supply of livestock coming to market. The meat from all the animals which come to market and are slaughtered must be sold within a short time. This meat must be priced low enough to move it into consumption. In 1935 the price of pork was high because the supply of hogs arriving at the markets had been reduced sharply as a result of the government's restriction of production program and the adverse western conditions.

Individual tastes of consumers are reflected in the demand for types of animals. Hogs destined for slaughter and sale in New England must be of medium to heavy weights (180 to 200 pounds and up), since the demand in this section is for the heavier grades

of hams and loins, and also of bellies and bacon. The lighter weight pork cuts are preferred in New York City and bring a premium over heavier cuts. New England receives heavier weights of cattle, and steers are purchased in preference to heifers. Chicago, on the other hand, generally prefers lighter weights. Other variations occur in preference for types of beef; some towns want principally meat from heifers or cows, while others prefer that from steers. Demands based on religion have an important

EXHIBIT II
MEAT CONSUMPTION FROM UNITED STATES SLAUGHTER
(In pounds per capita)

Year	Beef	Vcal	Lamb and mutton	Pork (exclud- ing lard)	Lard
1900	67.0	5.2	6.5	71.9	12.9
1905	70.9	6.6	6.3	70.6	11.6
1910	70.5	7.2	6.4	62.4	12.4
1915	57.1	6.0	6.2	67.3	11.8
1920	59.1	8.0	5.4	63.5	12.2
1925	60.0	8.6	5.3	67.3	12.5
1930	48.8	6.4	6.7	67.0	12.7
1935	53.1	7.9	6.9	48.5	9.6
1936	58.6	8.4	6.7	55.4	11.2
1937	54.8	8.3	6.7	55.5	10.6
1938	54.0	7.4	6.9	57.1	11.3

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meals, and Wool Market Statistics and Related Data, 1938* (Washington, May, 1939), p. 86.

effect on types of meat as well as on the method by which the animals are killed. The orthodox Jew does not eat pork, and eats only "kosher" beef. Although the figure seems very high, it has been estimated that 25% of all steers marketed in the United States are kosher slaughtered.¹

Temperature affects both the amount and the type of meat consumed. In hot weather the consumption of meat, particularly of fresh beef, declines abruptly, and the lighter cuts which can be quickly prepared are preferred to the heavier cuts intended for roasting or boiling. Then, too, because consumers usually want to inspect meat before they buy it, several local storms which keep housewives indoors cause a decline in the retail sales of meat.

¹ Rhoades, E. L., *Merchandising Packing House Products* (Chicago, University of Chicago Press, 1929), p. 17.

The demand for meat products, however, seems to be more directly related to incomes, pay rolls, and consumer purchasing power. According to some studies, in periods when the average annual income of consumers remains the same, the total amount spent annually for pork remains the same regardless of the supply and the number of pounds sold.¹ To a major degree, therefore, consumer income determines the value of the meat supply.

Approximately half of the consumer's meat dollar is returned to the producer in payment for his livestock.² The remainder of the dollar represents the costs of retailing, wholesaling, transportation, and processing. From the standpoint of the producer, half of the consumer's dollar may seem to be too small a proportion, but from an impartial point of view, it is surprising that such a large industry, its workers, transporting mediums, branch warehouses, stores, and refrigerating facilities can be operated on such a small cost margin.

Packers state that the price paid for livestock in the central markets is largely determined by the prices which the packer is receiving or expects to receive for meat and by-products, or in other words, the price which the ultimate consumer is willing to pay in the retail markets. Consequently, although packers do not sell direct to the consumer, the retail dealer, as well as the jobber, the wholesaler, and the chain store operator, is thinking in terms of retail prices when he buys his supplies.

The economist of Swift & Company, Mr. G. E. Putnam, stated that the price which his company's buyers bid for hogs was determined by the composite price at which all products of the hog were selling at that time.³ As to the volume of supplies and their relation to price, Mr. Putnam stated:

¹ U. S. Department of Agriculture, *Economic Situation of Hog Producers*, Senate Document No. 184, Seventy-second Congress, Second Session (Washington, Government Printing Office, 1933), pp. 17-18.

² University of Chicago, Studies in the Meat Packing Industry, *What Becomes of the Consumer's Meat Dollar?* by Bernard F. Tobin, (Chicago, University of Chicago Press, 1936), p. 4.

³ Hearings before the Committee on Agriculture and Forestry, United States Senate, Seventy-third Congress, Second Session, on S. 2133, S. 2621, and S. 3064, Bills to Amend the Packers and Stockyards Act, 1921, p. 269. Mr. Putnam's testimony in part was as follows: "We have a man in our Chicago office who does nothing all day long except make up composite hogs. At every hour of the day we know how pork loins are selling; . . . how hams are selling; . . . how lard is selling, and so forth . . . On the strength of what we are getting for each of these products, this man who makes up the composite hog simply assembles all of these products together and their values. He immediately knows what a live hog is worth, and it is on that basis that we make bids for live hogs."

When we see the market being flooded with hogs we know . . . that we are going to have more pork on our hands than we have had for a long time. We know that pork is perishable and must be moved into consumption within 10 days. We know . . . that we are not going to be able to move that increased supply of pork into consumption except at lower prices.¹

Mr. Putnam's views are shared by others outside the industry. In a special letter to the Senate from the Secretary of Agriculture, the following statements are made:

The immediate demand for hogs is found in the hog markets, where the buyers of hogs and the supply of hogs meet. This demand is not for something to be consumed by these buyers; it is for a raw material that goes by different stages to the actual consumer, who is the buyer of meats and processed products. The ultimate demand then is the demand of consumers for the products of hog slaughter. . . . The actual meeting place of consumer demand and the bulk of supply, which is meat, is at the retail counter or at hotel and restaurant tables. The effective or organized meeting place is in the wholesale meat markets of all kinds where sales are made to retailers and to buyers for many hotels and restaurants. Here the retail buyers, who represent consumer demand, and the wholesale salesmen, who represent hog supplies, do the bargaining that determines directly the price of hogs for slaughter and indirectly the price for all hogs.²

This discussion simmers down to a point that is frequently misunderstood; the price which the packer can afford to bid for livestock is determined by the prices which the consumer is willing to pay for the various cuts of meat in the quantities which must be moved into consumption. The two blades of the scissors, supply and demand, are the receipts of livestock at the market plus meat in storage on the one hand, and on the other, the amount of money in the hands of the consumer available for purchases of meat. The packer attempts to maintain a spread between the amount he pays for livestock and the amount he receives for meat and by-products. This spread must reimburse him for the costs of operating his plant and for the payment of his employees and, if possible, yield a profit. Competition is constantly battering the packer in an attempt to reduce this spread; competition for available livestock supplies forces the price of livestock up, and

¹ *Ibid.*, p. 275.

² U. S. Department of Agriculture, *Economic Situation of Hog Producers*, pp. 14-15.

competition in the sale of products tends to keep the sales price down. The packer, however, must take this business risk in connection with the functions which he performs, and in this respect he is no different from the cotton merchant, the tobacco manufacturer, or any other businessman.

In carrying out his functions, particularly in attempting to create demand and increase the sale of his product, the packer is performing a direct service to the producer. Admittedly this service is not altruistic, since the packer acts to increase his own profit margin, but, as previously pointed out, the producer derives the same gross return from the retail sale of meat products as do the processor, handler, and retailer combined.

DESCRIPTION OF MAJOR UNITS IN THE MEAT-PACKING INDUSTRY

Because of the government's various investigations of the large packers, the industry is usually thought of in terms of the "Big Four": Armour, Swift, Cudahy, and Wilson. Although these four concerns are outstanding in the industry, there are many other companies conducting slaughtering operations and an additional group processing and curing meat products. In 1936 there were 815 packing concerns reporting to the Bureau of Animal Industry under the provisions of the Packers and Stockyards Act. A summary of their operations in recent years is shown in Exhibit 12.

Swift & Company is the largest unit in the industry in terms of volume of sales and size of organization. Net sales were \$973,816,615 in 1938 and \$885,836,530 in 1937. In 1937 the company operated 50 meat-packing plants in various cities in this country and Canada, and over 100 produce plants manufacturing butter, assembling, grading, and packing eggs, and preparing poultry for the market. The company also operated 24 cottonseed oil mills or refineries.

To a greater degree than other packers, Swift & Company has divested itself of its subsidiaries' operations which were not directly connected with the meat-packing business in this country. The company sold its entire fleet of 6,000 refrigerator and tank cars to General American Tank Car Corporation under an agreement by which the company was assured of an adequate supply of cars. In 1918 the company turned over to its own shareholders its interest in *Compañía Swift Internacional*, and thereby divested

itself of its South American and Australian properties. The company now has no foreign plant investment of consequence other than in Canada. By order of the Supreme Court of the District of Columbia in July, 1933, Swift & Company turned over its 74% of the stock of Libby, McNeill, & Libby, vegetable, fruit, and meat canners, to a trustee, who was ordered to dispose of the stock as soon as possible at a price to be approved by the court.

EXHIBIT 12
OPERATIONS OF THE PACKING INDUSTRY, 1932-1938

Year	Number of packers reporting	Average net worth (in thousands)	Total income (in thousands)	Total expenses (in thousands)	Net gain or loss (in thousands)	Net gain or loss to net worth	Establishments operating under Federal inspection	
							Number*	Number conducting slaughter
1932	868	\$941,047	\$2,204,146	\$2,212,033	-\$ 7,887	-0.84 %	745	314
1933	871	921,602	2,096,484	2,062,289	+ 34,195	+3.71	742	315
1934	851	882,572	2,550,583	2,517,305	+ 39,279	+4.45	722	308
1935	845	852,539	3,103,710	3,054,326	+ 49,384	+5.79	706	296
1936	815	889,482	3,428,938	3,377,004	+ 51,993	+5.84	684	300
1937	808	871,453	3,674,284	3,641,410	+ 32,874	+3.77	675	295
1938	.....	.....	.....	.....	.....	.....	663	296

* Includes branch houses, serum plants, sausage factories, etc.

Source: Financial data from U. S. Department of Agriculture, Bureau of Animal Industry, *Report of the Chief, 1938* (Washington, Government Printing Office, 1938), p. 54. Inspection statistics from U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data, 1938* (Washington, May, 1939), p. 26.

According to the company's report to the Securities and Exchange Commission in 1937, this stock was still being held by the trustee. This transfer to a trustee followed the company's unsuccessful attempt to have the Packers' Consent Decree modified.¹

Some of the Swift trade-marks include Premium ham and bacon, Silverleaf lard, and Jewel shortening. The largest-selling brand of butter in 1935 was Brookfield, a Swift & Company product.

Armour & Company is the second largest of the "Big Four" packers. Sales during the year ended October 29, 1938, amounted to \$723,537,907. In 1937 the company operated 27 meat-packing plants in this country, 320 branch houses, 8 cottonseed oil plants, and 50 produce plants, and owned 5,750 refrigerator cars. The principal by-products of meat packing which the company pro-

¹ See page 103.

duced were soap, fertilizer,¹ wool, and leather. Unlike Swift, the company also owned and operated packing plants in Argentina, Brazil, and Uruguay. Most of the production of these plants was shipped to the British Isles.

In 1932, after the United States Supreme Court refused to permit modification of the Consent Decree, the company disposed of its fruit and vegetable canneries. The brands which the company uses for its packaged goods are Star and Cloverbloom.

*Wilson & Company*² ranks third in size in the meat-packing industry, with a sales volume of \$265,465,324 for the year ending October 29, 1938. In 1937 the company had 10 meat-packing plants in this country, 2 plants in South America, 100 sales branches in this country, and owned 1,600 railroad cars of which 1,400 were refrigerator cars. In addition, the company had a soap factory, a fatty acid and stearic acid plant, and owned a number of produce-buying stations and creameries.

The company sells meat and its by-products, poultry, cheese, butter, and eggs, and owns 56% of the common stock of General Sports, Inc. This latter concern owns, in turn, the Wilson Sporting Goods Company, Lowe & Campbell Athletic Goods Company, and the Horace Partridge Company, manufacturers and distributors of sporting goods for golf, tennis, baseball, and football.

Cudahy Packing Company, the remaining member of the present "Big Four," had net sales of \$192,407,537 in 1938. It has 12 meat-packing plants, 13 produce plants, 80 branch houses, 1,500 refrigerator cars, and 44 tank cars. All its property is in the United States. This company's most famed product not directly related to meat is Old Dutch Cleanser.

The company was established in 1885 by Michael Cudahy, a former employee of Armour & Company, and was originally known as the Armour-Cudahy Packing Company. After a few years of profitable operation, Cudahy was able to buy out the Armour interest and establish the Cudahy Packing Company.

¹ Tankage, which was the by-product material formerly used for fertilizer, is now used principally as animal feed, and the fertilizer operations now have less direct connection with the packing houses than previously.

² Wilson & Company was the corporate successor of Schwarzschild & Sulzberger, which was formerly one of the "Big Six" packers. The other five were: Swift & Company, Armour & Company, Morris & Company (acquired by Armour & Company in 1923), National Packing Company (owned by the first three and dissolved in 1912), and Cudahy Packing Company.

In addition to the so-called "Big Four" packers, there are three companies of considerable importance principally because of their volume of operation in packing pork and pork products. The largest of these companies is *John Morrell & Company*, which had an annual sales volume of \$90,987,225 for the year ended October 29, 1938. This concern has packing plants at Ottumwa, Iowa; Sioux Falls, South Dakota; and Topeka, Kansas. The plants are equipped to handle a total of 2,950,000 animals annually. Distribution is secured through 13 branch houses.

Similarly, pork and pork products constitute the largest proportion of the business of *Geo. A. Hormel & Company*. This company, however, also manufactures meat-flavored vegetable soups, and cans whole chickens and hams. Although its principal plant is in Austin, Minnesota, the company operates a total of 19 branches, principally in the South and West. Its net sales for the year ended October 29, 1938, were \$56,921,648.

The plant of the *Rath Packing Company*, located in Waterloo, Iowa, has an annual capacity of 1,500,000 animals. During the year ended October 29, 1938, net sales of the company amounted to \$47,920,091. Although this concern originally slaughtered only hogs, it now derives a small percentage of its total sales from poultry, butter, and eggs. The company in 1937 had 10 branch houses and operated its own refrigerator cars in distributing its Black Hawk brand of bacon, ham, and other pork products.

Other companies of importance, although smaller than those described, include *Jacob Dold & Company*, *Oscar Mayer & Company*, and *Kingan & Company*.

EXPORT MARKETS FOR MEAT PRODUCTS

The export market has always represented a substantial proportion of the total market for American meat products. Until 1924 the United States was the world's most important exporter of meat products. Since that time the Argentine has surpassed the United States principally because of its large exports of beef and beef products. Other important exporters include: New Zealand, Uruguay, Australia, Denmark, and Brazil.

The largest importer of meats is the United Kingdom; in the prewar years the United Kingdom took over one-half of the total

THE AGRICULTURAL INDUSTRIES

EXHIBIT 13
INTERNATIONAL TRADE IN BEEF AND BEEF PRODUCTS, AVERAGE 1925-1929, ANNUAL 1934-1936
(In thousands of pounds)

	Annual average, 1925-1929		1934		1935		1936*	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal exporting countries								
Argentina.....	1,552,601	93	994,511	42	1,004,426	40	982,921	35
Uruguay.....	334,616	0	201,221	0	255,843	0	178,482	0
Australia†.....	284,476	1,711	228,346	1,867	306,163	722	248,664	736
Netherlands.....	237,540	159,721	36,765	51,537	24,782	44,130	27,691	36,403
United States.....	144,303	84,233	90,658	94,207	51,873	343,633	52,345	164,819
New Zealand.....	115,286	626	163,175	341	148,366	412	154,029	461
Brazil.....	109,765	7,221	96,396	1,710	53,001	.....	21,292	.....
Principal importing countries								
United Kingdom.....	34,345	1,795,364	28,616	1,559,827	69,871	1,495,624	49,227	1,506,829
Germany.....	4,267	386,911	285	56,014	20	37,884	21	119,283
France.....	35,518	146,920	22,294	35,418	41,984	27,181	22,287	24,037
Belgium.....	38,559	122,183	3,000	46,583	3,014	24,197	3,934	19,405

* Preliminary.
† Year ended June 30.
Source: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 346, p. 256; *Ibid.* 1938, Table 407, p. 294.

EXHIBIT 14
INTERNATIONAL TRADE IN HOG PRODUCTS, AVERAGE 1925-1929, ANNUAL 1934-1936
(In thousands of pounds)

Principal exporting countries	Annual average, 1925-1929		1934		1935		1936*	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
United States.....	1,136,856	10,459	596,662	1,647	191,746	10,531	187,046	41,846
Denmark.....	557,264	2,869	521,411	679	472,345	112	420,893	0
Netherlands.....	249,396	15,089	126,374	2,658	112,300	5,590	92,969	4,396
Irish Free State.....	92,656	55,011	68,574	189	80,695	88	84,532	0
Canada.....	90,757	17,247	124,661	7,294	146,208	485	203,777	2,940
Principal importing countries								
United Kingdom.....	5,883	1,371,607	2,338	1,426,883	3,153	1,169,678	7,021	1,141,079
Germany.....	4,584	322,127	2,090	152,228	194	144,816	81	184,498
Cuba.....	0	130,315	0	34,269	0	33,101	0	.....
France.....	3,135	88,097	1,613	11,354	13,735	5,834	2,328	6,862
Czechoslovakia.....	3,665	79,769	413	29,777	279	21,464	219	37,245

* Preliminary.
Source: U. S. Department of Agriculture, *Agricultural Statistics*, 1937, Table 367, p. 269; *Ibid.*, 1938, Table 429, p. 310.

world exports of meat.¹ Recently it was estimated that the British Empire consumed 80% of the beef and veal entering world trade, and of the Empire's total Great Britain imported by far the largest proportion.² In 1934 and 1935, largely as a result of drought, the United States became a net importer of beef. The principal exporters and importers of beef and beef products are shown in Exhibit 13.

Lard is still an important export of the United States, and pork products such as ham, bacon, and other cured pork products also provide a substantial amount of export trade. Total United States exports of pork products have declined substantially, however, since the 1920's and in 1935 were less than 15% of the average exports of the period, 1925-1929. One of the principal causes for this decrease was the large expansion of hog production in foreign countries.³ United States exports of mutton and lamb are negligible and unimportant, while imports are smaller than those of hog products. Changes in exports and imports of hog products are shown in Exhibit 14.

APPRAISAL OF PROBLEMS

The problems confronting the livestock and meat-packing industry are in many respects peculiar to these industries. In the solution of these problems, the livestock producers and the executives of the meat-packing industry have an equal interest.

One important area in which there are many problems is that of price. The relatively steady national demand and a fluctuating and relatively unpredictable supply at the stockyards sometimes result in prices unsatisfactory to both producers and packers. The price which producers receive for their livestock is a matter of paramount interest to them since their income for a season's operation depends upon this factor. The packers obviously are eager to keep the producers satisfied, but successful business operations depend in part on the relative prices which they pay for livestock. Since meat is a basic food product, the demand is relatively steady, but there is always the possibility that com-

¹ McFall, *op. cit.*, p. 572.

² Great Britain Imperial Economic Committee, *Cattle and Beef Survey* (London, His Majesty's Stationery Office, 1934), p. 5.

³ U. S. Department of Agriculture, *World Trade Barriers in Relation to American Agriculture*, Senate Document No. 70, Seventy-third Congress, First Session (Washington, Government Printing Office, 1933), p. 186.

peting food products will be substituted if meat prices are out of line. Because fresh meat must be delivered to the consumer within three weeks after slaughter, the problem of adjusting supply to the retail demand is a delicate one. The packers' daily estimate of this situation is reflected in the prices which they bid for the livestock in the market.

The problem of setting prices to adjust supply to current demand is intensified by the fact that the packers must usually take their normal percentage of the supplies which are sent to the central markets, in order to maintain their position in the market and to utilize their packing facilities and work force as intensively as possible. This situation creates a series of problems for the packers. They have no means of control over the daily supplies which come to market other than through the prices which they bid for specific lots of livestock. They cannot remain out of the market for several weeks since they must supply the regular demand from their customers for fresh meat.

The fact that each packer attempts to maintain his position in competition with other packers by buying his proportion of the supply does not imply any sort of agreement between packers. This policy is primarily a defense against one packer's operating at a higher percentage of capacity and thereby reducing overhead costs per unit.

The perishability of the products, which requires extensive refrigeration facilities and speed of delivery, the volume of products handled, and the heavy weight of the products make the problems of distribution distinctive and difficult. The necessity for carefully controlled temperatures and for highly organized distribution facilities creates many problems. New methods of refrigeration and improved systems of transportation must be investigated. The introduction of the refrigerated truck, for example, has caused a substantial change in the distribution of meat. The efficiency with which distribution problems are solved will obviously affect the public demand for the product.

While a small quantity of some cuts of meat can be either cured or canned, it is impossible to place any large amount of the total production in storage, and some cuts must always be sold as fresh meat. With changes in consumer tastes and diet preferences, there is a constant necessity for keeping pace with shifts in demand. Furthermore, since a particular type of meat in

demand cannot be produced without also producing a number of other types of meat, the packers obviously cannot concentrate on producing only the most desired products.

Other problems arise because the packer has no contact with the consumer except through the retail markets. It is likely that the recommendations of these retail salesmen carry much greater weight with the consumer than the packer's advertising. Furthermore, meat sold at wholesale is usually fairly well standardized as to cuts, but in the retail trade the names and cuts of meat vary between localities and sometimes between stores in the same locality. There has been an increase in the number of retail dealers specializing in the grades and cuts of meat demanded by their clientele, which in turn has resulted in an increase in sales of special cuts of meat. As a consequence, many dealers are buying only special cuts of meat, differing from those dealers who customarily buy a larger proportion of the carcass and dispose of all the cuts which can be secured from it.

Aggressive merchandising by the packers may stimulate demand for certain products or cuts now sold only to certain restricted groups or primarily on a price basis. The cooperation of retailers in such a project is essential. The extent to which the ultimate consumer may be influenced can be determined only by experiment.

Consumers have in recent years preferred lighter cuts of meat. This has had an influence on the production of livestock. Cattle are being marketed at younger ages and called "baby beef," and hogs of lighter weight are being shipped. The changes in the markets have also created other problems for the livestock producer. Corn can apparently be fed to greatest advantage to hogs of the lard type, but our export markets for lard have declined, and there is increasing competition from cottonseed oil and corn oil. The market for lard hogs seems to be less promising, therefore, than the market for bacon-type hogs.

While substantial progress has been made in creating consumer preference for brands of cured, processed, or packaged meats, the consumer is usually unaware of the source of fresh meats, such as beef, veal, and fresh pork. Swift & Company stamps its brand on prime carcasses and cuts, and has also packaged fresh meat such as roasts, lamb and pork chops, and steaks. By such means it has attempted to create a consumer preference for its products. Quick-frozen meats, such as the Birdseye products, are a branded product, and frozen steaks are being dis-

tributed with the frozen fruits and vegetables. There has been, however, some objection by organized meatcutters to the packing and sale of small cuts ready for the consumer.

The decentralization of the packing industry has changed the competitive situation substantially in the last few years. The greater number of interior packers and the increase in direct marketing have reduced the receipts of livestock at the central markets where the large packers have established their plants. This transition appears to be a broad movement created by changing techniques and improved communication and transportation facilities, just as other changes in techniques and transportation in the late nineteenth century caused the packers to establish large plants at central markets.

The decentralization of the industry also raises some problems as to the optimum size of an operating plant. Large plants were established at Chicago, St. Louis, Kansas City, Omaha, and St. Paul to handle the large supplies coming to these markets. With the increase in direct marketing and the declining receipts at these markets, the economical operation of the extremely large packing plants has been made even more difficult. Large investments have been made in these plants, and a continued decline in the volume of operations would mean serious financial losses to the packers.

The geographical dispersion of the industry also creates other new problems. One was apparent in the drought years, when plants located at country points in the drought area were unable to secure adequate supplies, while packers in central markets, where supplies were also considerably restricted, were still able to secure cattle from areas not affected so adversely by the drought. The expansion of the livestock industry in the South and the recent establishment of packing plants there raise the question as to the relative importance of this area in the future. Hog production, as a supplementary cash crop, could conceivably be developed in areas formerly devoted exclusively to cotton but which could be used for corn.

The increase in livestock production in the South is only one of the fundamental trends in livestock production which have been taking substantial form in recent years. Partly as a consequence of this increase in southern production, the seasonal distribution of marketing of cattle, hogs, and sheep has been slowly flattening out during the past few years. Efforts of producers to reduce

seasonal gluts have also been important in this respect. The shifts in consumer preference for types of meat and the changes in demand for lard and other products described above may accentuate some of these important changes in livestock production. With such changes problems of the packers are intensified.

Since the packers supply a food product demanded by millions, and also provide a market for the farmers' livestock, relations with the public are also important. Livestock producers naturally desire to obtain the highest price for their product, while consumers want to obtain meat at the lowest possible price. This conflict of interest, together with the vital part that the meat and livestock industry plays in the life of the nation, has caused public resentment at times. For example, resistance to high prices of the more desired grades and cuts of meat caused the "meat strikes" of 1937, which penalized producers as severely as packers. The situation is, of course, further complicated by the effect of government and court restrictions on the packers' activities. The most important of these restrictions, the Packers' Consent Decree, was applied in 1920 and still remains in force.

New uses of by-products, particularly those which now sell at low prices, may provide increased revenues. Advancement in chemical research is a corollary of progress in the packing industry, and many of the present valuable uses of by-products were developed in the packers' laboratories. On the other hand, the principal product is meat for human consumption, and it is possible to overemphasize the importance of by-products.

The implication of these problems is that meat-packing establishments must in the future be both aggressive and flexible. The difficulties ahead can be met by either a large or small organization which keeps pace with the rapid changes occurring in distribution, in demand, and in merchandising. These are business problems, but in finding effective solutions the meat-packing industry will be contributing to the solutions of the problems facing the livestock producers. It will not be possible for either the individual producers or their leaders to ignore this relationship without tragic results. Any satisfactory approach to the problems of the livestock industry must take into account the policies of the packers in meeting the issues which determine their business success. The two groups are mutually dependent, and any conflict serves only to affect adversely the interests of both groups.

CHAPTER IV

THE COTTON AND COTTON-TEXTILE INDUSTRY

Cotton is truly a world commodity. It is grown in more than 60 countries; all the principal countries have large cotton-textile industries; and the price of cotton is determined in a world market. Until 1934 more than half the American cotton crop produced each year was sent to foreign markets. As a consequence, cotton in terms of value was the most important product exported from this country for many years, and it still constitutes the largest dollar volume of exports of any agricultural commodity.

The cotton crop of this country is strictly regional. The economic and business structure of the South has long been dependent on the cotton harvest. The southern cotton growers, ginner, factors, fertilizer dealers and manufacturers, mercantile establishments, cotton shippers and brokers, compresses, warehouses, mills, railroads, and banks depend upon the growing and the marketing of the cotton crop for a substantial part of their income. The variations in cotton prices, the production and consumption of cotton in this and other countries, and the government activities affecting cotton are of vital importance to all the people engaged in these enterprises. Both the share cropper existing on molasses, corn meal, and "fat back" and the plantation owner eating his hog jowl and field peas on New Year's Day depend on the cotton crop for cash to finance them through the following year or to repay loans extended during the growing season.

The vicissitudes of the growers of cotton have been rivaled by those of the processors of cotton. The cotton manufacturing industry, originally composed of a number of small units located in the North, has grown and migrated to the South. It has experienced serious labor difficulties and even riots both in the North and in the South. Competition has been intense and profits of the industry with the exception of one or two years have been almost nonexistent during the last decade.

The cry, "Cotton is king," has resounded throughout the South for a century, but the despot is neither so supreme nor so benevolent as he was in previous years, although he continues to reign, for better or worse, over millions of subjects.

TYPES OF COTTON

The expert distinguishes characteristic features of each tuft of cotton, although to the layman all cotton may seem to be about the same. The fibers making up the fluffy white tuft are attached to the seed of the cotton plant and range from 2 inches or more in length to the short fuzz, called linters, left on the cottonseed after ginning.

The cotton plant usually grows waist high, but ranges from 2 to 6 feet in height. The seeds of the cotton plant are enclosed in a boll usually consisting of three to six compartments or "locks" containing the seeds to which the fibers are attached. The bolls burst when ripe, the fluffy fibers spreading so that they can easily be grasped and detached from the boll. The bolls normally begin to ripen in July or August, depending upon the region, and the plant continues to produce until the first killing frost.

Since the fibers from a single seed vary in length, it might appear that the problem of classifying cotton would be impossible of solution. The classing of cotton is done by eye and by "feel"; experts can class cotton accurately, noting the length of fiber or staple, the color, the cleanliness, the "cry" when the fibers are pulled apart, and the feel of the cotton. The cotton classers are guided, however, by actual United States government samples of the principal staples and grades.¹

Cotton is usually classified according to three qualities: staple, grade, and character. The staple indicates the length of the fiber, which ranges from $\frac{1}{4}$ of an inch to $2\frac{1}{2}$ inches. The shortest staple recognized by the United States Bureau of Standards for trading purposes is $\frac{3}{4}$ of an inch. Cotton of a shorter staple than this, however, is often sold for use in spinning coarse grades of

¹ Even this does not solve the problem completely because of varying official views as to the amount of cotton of a specific length that is required in each tuft. For example, cotton classed in Liverpool as $1\frac{1}{8}$ -inch staple barely squeaks by the American standard for $1\frac{1}{16}$ -inch staple. Todd, John A., *The Marketing of Cotton* (London, Sir Isaac Pitman and Sons, 1934), p. 43. In addition, certain mills have specific requirements which do not conform exactly to government standards or require additional qualities not reflected in the official grades.

yarn. Although the staple in one strain of cotton is usually rather uniform in length, the cotton from a sample of 1-inch staple may range from a short fuzz to fibers $1\frac{1}{4}$ inches in length. The majority of the fibers, however, are usually of the length specified in the description of the staple.

The three main types of American cotton are short staple upland, long staple upland, and American-Egyptian or Pima. Short staple upland usually ranges from $\frac{5}{8}$ to $1\frac{1}{8}$ inches in length; long staple ranges from $1\frac{1}{8}$ to $1\frac{1}{2}$ inches; and the length of American-Egyptian runs from $1\frac{3}{8}$ to $1\frac{11}{16}$ inches. Sea Island cotton, an unusually fine type with a staple length of $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, was formerly grown in large quantities in the coastal regions of the South Atlantic States. Production of Sea Island cotton declined to negligible proportions for a number of years because of the susceptibility of this type to the ravages of the boll weevil. In 1937, however, Sea Island cotton was again planted in Georgia and Florida, and in 1938 a total of 26,000 acres was planted with this type of cotton.¹ The long staple cottons can be spun into finer yarns and used in the manufacture of the better qualities of hosiery, knitwear, and lace, and for mixing with silk and wool in finer fabrics. The short staple fibers are used for the coarser grades of yarns and comprise the largest percentage of the United States cotton crop. The cotton crop of the United States, classified according to principal grades and staple lengths for the years 1934, 1935, and 1936, is shown in Exhibit 1.

Although the staple determines in part the use that will be made of the cotton and the price at which it will be sold, the grade of cotton is also of considerable importance in determining price. The term "grade" includes: (1) color and brightness of the fiber; (2) the nature and the amount of foreign matter in the lint; and (3) "preparation," as evidenced by the extent of damage to the fibers caused in the ginning process. The basic color designation is white, and the colors range from "blue stained" to "yellow stained," eight different color designations being recognized. The amount of foreign matter is expressed by terms which have become traditional in the trade. The grade that is freest from foreign matter is described as "middling fair" and the grade

¹ Better weevil control, improvement of the strain, and the fact that cultivation of Sea Island cotton is not restricted by the cotton control program of the Agricultural Adjustment Administration have contributed to the increase in acreage.

THE AGRICULTURAL INDUSTRIES

EXHIBIT 1
COTTON CROP OF THE UNITED STATES BY GRADE AND STAPLE IN 1934,
1935, AND 1936
(In thousands of bales)

Classification	1934	1935	1936
Total.....	9,472.0	10,420.3	12,141.4
American upland.....	9,458.0	10,402.7	12,123.8
American-Egyptian.....	14.0	17.6	17.6
Grade (American upland)			
Extra white:			
Good middling and above.....	924.4	341.7	70.5
Strict middling.....	2,259.3	1,064.6	24.4
Middling.....	1,284.2	568.4	0.6
Strict low middling.....	281.9	150.7	1.1
Low middling and below.....	64.6	26.4	1.6
White:			
Middling fair.....			0.1
Strict good middling.....	0.6	0.7	3.8
Good middling.....	110.0	40.2	447.8
Strict middling.....	1,187.2	1,424.2	2,545.4
Middling.....	1,424.6	2,484.7	3,478.4
Strict low middling	468.2	1,232.4	1,932.8
Low middling.....	107.2	494.6	763.7
Strict good ordinary.....	33.4	186.0	214.8
Good ordinary.....	11.4	69.1	33.8
Spotted:			
Good middling.....	130.2	57.7	164.8
Strict middling.....	664.4	825.3	1,213.6
Middling.....	345.4	672.1	779.4
Strict low middling.....	96.3	319.1	109.8
Low middling.....	28.2	194.2	84.2
Other*.....	24.4	204.2	120.9
No grade†.....	12.1	46.4	42.3
Staple length (American upland)			
Shorter than 7⁄8 inch.....	783.0	1,320.1	1,151.6
7⁄8 and 29⁄32.....	3,490.9	3,235.1	3,143.1
15⁄16 and 31⁄32.....	2,065.4	2,628.1	2,617.3
1 and 11⁄32.....	1,415.6	1,682.2	2,748.7
11⁄16 and 13⁄32.....	880.1	866.5	1,554.7
11⁄8 and 15⁄32.....	680.6	554.0	732.0
13⁄16 and 17⁄32.....	123.1	102.6	156.3
11⁄4 and longer.....	19.3	14.1	20.1

* Includes yellow tinged, light yellow stained, yellow stained, gray and blue stained.

† Includes bales not otherwise classified above.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 124, pp. 104-105.

having the greatest amount of dirt or “trash” in the lint is described as “good ordinary.” There are nine recognized terms for classifying the grade of cotton according to the amount of foreign matter contained (see Exhibit 1).

The term "character" covers such factors as the degree of uniformity of length of fibers, strength, silkiness, and the degree to which the fibers tend to adhere to each other. The strength of the fiber is the most important quality in considering character, since "soft" cotton is likely to be rejected by mills. If only the grade and staple are stated, good character is assumed.

To determine the price per pound of a bale of cotton or of a number of bales, the buyer and seller agree on the premium or discount from the base price which the staple length and grade of the cotton justify. The base price is the price at which the future deliveries of the basic grade, $\frac{7}{8}$ -inch middling white cotton, is recorded in trading on one of the major cotton exchanges. The base price is quoted in cents and hundredths of a cent, and $\frac{1}{100}$ of a cent is termed a "point." The premiums or discounts are referred to as points "on" or "off" this base price. There are grade differentials and staple differentials, although a change in supply or in the demand for a certain type of cotton to be used for a specific purpose frequently results in fluctuations in these differentials.¹ There is no premium for good preparation, but points are taken off for poor preparation. In all, the government recognizes 32 grades and 20 staple lengths of cotton; hence 640 kinds of cotton are officially recognized and can be bought and sold according to government standards. By reference to Exhibit 1, however, it is apparent that the problem of classifying is not so confusing as it might seem, since 80% to 90% of any crop is either white or extra white, 70% to 80% either strict low middling, middling, or strict middling, and 75% to 85% is within the six staple lengths from $\frac{7}{8}$ of an inch to $1\frac{1}{32}$ inches.

PRODUCTION OF THE COTTON CROP

Before the Civil War cotton was produced principally in the South Central and the Southeastern states, Mississippi being the largest producer, followed by Georgia and Alabama. After the Civil War, production expanded rapidly in the Southwest and by

¹ In addition, the "basis middling" price, which is quoted on the futures exchanges, is in terms of bales of varying grade and staple, which may be delivered on a futures contract, whereas in the spot trade "even-running middling" prices for bales of like grade and staple are quoted. As a consequence, the even-running price is higher since a service has been performed in classing the cotton and selecting like grades and staples.

1890 Texas was the largest producer of cotton.¹ In recent years Texas has accounted for approximately a quarter of the entire crop of the country, and during the period 1928-1932 half the entire cotton crop produced in this country came from the three states of Texas, Oklahoma, and Arkansas. The principal cotton states and their production in recent years are shown in Exhibit 2.

EXHIBIT 2
COTTON PRODUCTION BY STATES, AVERAGE, 1927-1936, ANNUAL, 1937
AND 1938
(In thousands of bales*)

State	Average 1927-1936	1937	1938†
Texas.....	3,997	5,154	3,125
Mississippi.....	1,462	2,692	1,715
Arkansas.....	1,182	1,904	1,340
Alabama.....	1,159	1,631	1,080
Georgia.....	1,152	1,500	857
Oklahoma.....	903	773	570
South Carolina.....	798	1,023	650
North Carolina.....	710	780	400
Louisiana.....	655	1,104	676
Tennessee.....	436	661	487
California.....	225	738	423
Missouri.....	223	404	337
Arizona.....	127	313	196
New Mexico.....	89	163	95
Virginia.....	40	43	15
Florida.....	31	40	25
All other states.....	12	23	17
Total United States.....	13,201	18,946	12,008

* 500-pound gross weight bales.

† December 1 estimate.

Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 12, December, 1938 (Washington, Government Printing Office), p. 278.

The culture of cotton first began in the South Atlantic states in colonial times, this coastal region being best adapted to the long staple Sea Island cotton. This species, however, matured very late and was peculiarly susceptible to the ravages of the boll weevil. For this reason growth of this cotton has been concentrated in the West Indies, and only a small quantity is now grown

¹ In 1890 the United States crop was 7,472,511 bales, of which Texas produced 1,471,242 bales; Georgia produced 1,191,846 bales; Mississippi, 1,154,725 bales; Alabama, 915,210 bales; Arkansas, 691,494 bales; and Louisiana, 659,180 bales. No other state produced more than 350,000 bales. U. S. Census Office, 11th Census, 1890, *Statistics of Agriculture*, p. 45.

in the United States. The short staple upland cotton is grown in the South Atlantic states of North Carolina, South Carolina, Georgia, Alabama, and parts of Mississippi. Texas and Oklahoma also grow short staple upland cotton. In the alluvial plains of Mississippi and Arkansas the long staple upland is produced. The amount of American-Egyptian or Pima cotton grown in Arizona and California is insignificant compared with the total cotton crop of the United States.

The production of cotton in the Southeast and the Deep South is based on a social system which is a direct outgrowth of colonial times and which has been perpetuated by the continued dependence upon one cash crop. A large proportion of the crop is planted, cultivated, and harvested by Negroes whose forebears were slaves. The "plantation" as depicted by the romanticists, however, is an exception. This picture usually is that of a large white mansion on the steps of which pickaninnies are singing spirituals while a southern colonel, sporting a white goatee, flowing black tie, and white suit, listens appreciatively as he sips a mint julep from a heavily frosted glass. Even in the *ante bellum* South, 70% of the farmers were nonslaveholders and 50% of the remainder owned fewer than five slaves.¹ In quantity of production, however, the plantations were more important than the small farms, and were the principal source of the supply of cotton.

During the early days of Virginia, immigration was encouraged, and labor in the new colony was obtained by a system of indentured servants. A settler could hire an English servant for approximately five years for the sum of £8 including transportation costs to the new colony.² This practice developed from the apprenticeship system in England and served the double purpose of providing an adequate labor supply for the work in the new colony and of encouraging emigration to the New World. For many years during the early life of the Virginia Colony, a large number of immigrants were indentured servants. One of the difficulties involved was that the servants knew that they would be free within a relatively short time and were therefore disinclined to work. In addition, land was free for the asking, and as soon

¹ U. S. Works Progress Administration, Division of Social Research, Research Monograph V, *Landlord and Tenant on the Cotton Plantation*, by T. J. Woofter and others (Washington, Government Printing Office, 1936), p. XVIII.

² Phillips, Ulrich B., *Life and Labor in the Old South* (Boston, Little, Brown & Co., 1929), p. 23.

as the term of service expired, it was customary for the owner to provide the servant with supplies to start his free life. As these groups of men spread up and down the Atlantic Coast more land was farmed, and the planters soon turned to African slaves for their labor supply.

Slaves were brought over in great numbers, and although there were heavy losses both in transport and afterwards, slaves became established as the labor of the South. The second generation proved hardy enough to be considered as a commodity which could be bought and sold in various markets. With such a ready supply of labor the average planter could cultivate far more cotton than he or his family could care for themselves, or than could be cultivated through any system of hired labor. The Negro proved to be the perfect worker for this type of farming.

The plantation system was firmly established up to the time of the Civil War, but after Appomattox this economic and social structure was destroyed temporarily. The Negroes interpreted emancipation as a release from all work of any sort, and the planters were left without labor. A few of them tried to hire the Negroes on a wage basis, but soon discovered that as soon as a small amount of money was earned the Negroes were inclined to leave their work until their earnings were spent. The freed slaves had no property, however, and were quite dependent upon the planter for a living. After a period of readjustment the plantation system was established under a new regime. Although there was no more actual slavery, the conditions under the cropping and tenant system were almost the same as those in the days before 1860. Such a system proved to be the only solution to the situation created by a mass of laborers with no property, and planters with considerable land and no laborers.

The southwestern section of the Cotton Belt was not developed to any great extent until after slavery was abolished. The status of Texas as an independent frontier state was not conducive to the establishment of large plantations with corps of slaves. The importation of slaves was prohibited by Congress after 1808; hence, no new supply of labor was available after Texas became a state. Consequently, the plantation system was never established in this section, but after the Civil War the tenant system was adopted as the most efficient method of expanding cotton production.

The tenant system has continued until today in the South where 55% of the cotton farms are operated by tenants of one sort or another. The percentage of farms operated by tenants for the years 1920, 1925, and 1930 is shown in Exhibit 3.

EXHIBIT 3
PERCENTAGE OF ALL FARMS OPERATED BY TENANTS IN 1920, 1925,
AND 1930
(Cash Tenants, Share Croppers, Other Tenants)*

Location	1920	1925	1930
Total United States.....	38.1	38.6	42.4
The North.....	28.2	28.0	30.0
The South.....	49.6	51.1	55.5
The West.....	17.7	18.7	20.9
North Carolina.....	43.5	45.2	49.2
South Carolina.....	64.5	65.1	65.1
Georgia.....	66.6	63.8	68.2
Tennessee... ..	41.1	41.0	46.2
Alabama... ..	57.9	60.7	64.7
Mississippi... ..	66.1	68.3	72.2
Arkansas	51.3	56.7	63.0
Louisiana.....	57.1	60.1	66.6
Oklahoma.....	51.0	58.6	61.5
Texas.....	53.3	60.4	60.9

* Balance operated by either full or part owners or managers.

Source: U. S. Department of Commerce, Bureau of the Census, 15th Census of the United States, 1930, *Agriculture*, Vol. II, Part 2 (Washington, Government Printing Office, 1932), p. 31, Table 6.

NOTE: The Census Bureau uses the term "farm" to denote the amount of land tilled by one man or his family; for this reason the percentage figures are high.

Although there are many types of tenant farmers in the South, and nomenclature varies somewhat in different sections, they may be classified for the most part under three headings: (1) share croppers, (2) share tenants, and (3) cash tenants. The same groups are called colloquially (1) "on halves," (2) "third and fourth," and (3) "standing renters."

Since each tenant agreement is concluded on an individual basis to meet the requirements of a particular situation, there are many variations in the landlord-tenant status, and many combinations of these agreements with different ratios of payments are used. These three headings, however, cover the three general types of agreements in use today between the landlord and the tenant.

The cropper or half-and-half system is more like hired labor than tenancy since the laborers are instructed and supervised by the landlord. The cropper is paid by a share of the crop instead of in cash. The usual basis is for the landlord to supply everything except labor, fertilizer, and the cost of ginning. The cropper supplies all the labor, and the cost of fertilizing and ginning is split between the tenant and the landlord. Each then receives one-half the crop, both lint and seed, at harvest. In most cases the landlord provides rations or money, or both, during the growing season, and is repaid from the cropper's half when the crop is sold.

The share tenant or third-and-fourth system differs from the first classification in the ownership of the work animals. The share cropper is supplied with work animals by the landlord, but the share tenant usually supplies his own animals and feed. The landlord receives one-fourth of the cotton crop and one-third of the corn and other crops, and supervises the cultivation of these crops. He also pays one-third of the fertilizing and ginning costs of the cotton. This type of tenancy is more prevalent in the southwestern states of Arkansas, Oklahoma, and Texas than in the southeastern states. The landlord often advances funds or supplies during the growing season to this group also, but at times the tenant is able to secure credit at the local mercantile store.

The third group is much more independent of the landlord than the first two. The cash tenant or standing renter is free from any supervision by the landlord. He usually pays his rent with a stipulated amount of cotton (such as two bales for a one-horse farm), or in some cases he pays cash. The cash system is more prevalent where land is rented by one landlord to another.

One of the principal reasons for the use of slaves in *ante bellum* days, and for the prevalence of tenancy today rather than cash wages, is the large proportion of manual labor required to cultivate and harvest the crop. During the "chopping" and picking seasons, whole families are called out to perform the chores required in the crop's production.

The cotton seed is sown in late March, April, or May, depending on the region, the earliest planting being in the southern part of Texas and the latest in North Carolina and Virginia. The seeds are usually planted in furrows by a mule-drawn implement called a "dropper." It is customary to plant three or four times

as many seeds as necessary in order to be assured that one of the three or four will be a sturdy plant. After the plants have grown to a height of 2 or 3 inches, the cotton is chopped or thinned out. The weaker plants are cut out by a hoe and the sturdy plants left standing approximately 14 inches apart. The chopping is done by hand labor since it is necessary to discriminate between the individual plants.

Cotton requires from six to seven months of favorable weather for its development. Favorable weather means reasonably moist conditions until late June, considerable sunshine from then on without lengthy periods of dull or cloudy weather yet with reasonable intervals of precipitation, and comparatively dry weather during the picking season. With the proper use of fertilizer, cotton can be grown on almost any type of soil.

After the cotton is chopped, its flower develops from the small "square" or bud. In the middle of the Cotton Belt the flower usually begins to appear early in June. Each flower remains in bloom for only two or three days. It is creamy white in color the first day it appears, turns to pink or red the following day, and is a rich purple the third day, after which it falls. Hence, the fields are a riot of color for a short time. The small boll, which is left after the flower drops, enlarges and begins to ripen approximately eight weeks later. Picking then begins and continues as long as new bolls ripen and burst. Most of the picking is done in September, October, or November, although in years of bumper crops when labor is scarce, some fields are not cleared until January. No bolls ripen after the frost, but sometimes the cotton is not picked immediately. Weather will impair the grade, however, if the cotton is left in the fields too long. A cotton field is usually picked over at least two or three times in harvesting.

The cultivation of cotton during the growing period is very shallow and is designed only to eliminate the weeds. The roots of the plant are near the surface, and a deep culture injures them, causing the plant to shed its small bolls. In the Piedmont section of the South Atlantic states where the country is rolling, the prevention of erosion is a great problem to the farmers. In this section it is also necessary to use fertilizer extensively because many years of intensive farming have depleted the soil of its natural strength. Such use of fertilizer is not necessary in the southwestern section. (See Exhibit 4.) Fertilizer must usually

be purchased at the beginning of the growing season when the farmer is short of ready cash, and this situation creates a financial problem for the grower. The farmer's usual solution, when neither cash nor credit is available, is to skimp on the fertilizer for that year and to hope for more cash and better prices the following season.

EXHIBIT 4
FERTILIZER CONSUMPTION BY STATES, IN 1934, 1935, AND 1936
(In thousands of short tons)

States	1934	1935	1936*
Total North Atlantic states....	913	959	1,009
Total North Central states....	611	748	895
Delaware.....	36	38	39
Maryland.....	146	165	165
Virginia.....	336	379	386
West Virginia.....	48	55	55
North Carolina.....	877	1,000	1,039
South Carolina....	572	614	626
Georgia.....	549	617	685
Florida.....	423	418	513
Total South Atlantic states ...	2,987	3,286	3,508
Total South Central states.....	854	1,008	1,151
Total Western states.....	181	217	253
Total United States.....	5,546	6,218	6,816

* Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 640, p. 523.

Weather, pests, and fungoid diseases are the principal cotton crop hazards. Weather disturbances which create the greatest havoc include storms and high winds, excess rain, and lack of sunshine in the summer, or lack of rain in the planting and chopping seasons. The main insect pest is the boll weevil. Boll weevils puncture the squares and the partly developed bolls, in which they deposit eggs. As the eggs develop into grubs, the buds drop. Later in the season eggs may be laid in the mature bolls, and the cotton is then stained to such a degree that it is worthless. Proper care such as "dusting" the crop with poison can prevent some of the damage done by the weevils. The development of cotton which matures early also has reduced the damage done by the weevils. The cotton boll worm or caterpillar is another insect pest which ruins the growing cotton in much the same way as the weevil does, by boring into the bolls and causing them to drop.

Fungoid diseases result in the withering of the leaves and the death of the plant. The damage done by caterpillars and plant diseases is much less important, however, than the weevil damage.

There are so many factors that it is difficult at any one time to forecast the amount of the crop to be harvested. A crop developing beautifully in June or July can be ruined before August. On the other hand, while farmers in one section are encountering difficulty, those in another may harvest a bumper crop.

The importance of manual labor in the growing of cotton cannot be overemphasized. While the use of two-mule or two-row cultivators has increased the acreage that one man can handle, it has been estimated that in the eastern and central portions of the Cotton Belt, it takes about 270 man-hours to produce a bale.¹ Since this means the equivalent of one month's work, the production of one man is therefore limited to six or seven bales a year. With the assistance of all the members of his family, however, the average farmer is able to make about 10 or 12 bales a year. Of the time consumed in the production of cotton, almost half is used in picking. In other words, all the time spent in plant cultivation and chopping during the months preceding September is equivalent to the time consumed in harvesting the crop. This is true even in Texas where "snapping," which consists of breaking the entire boll away from the plant rather than picking the fluffy cotton from the boll, is common practice.² By snapping, one worker can harvest the equivalent of 350 to 400 pounds of seed cotton³ a day, whereas a good average for a cotton picker is 100 to 150 pounds a day.

¹ Garside, A. H., *Cotton Goes to Market* (New York, Frederick A. Stokes Co., 1935), p. 38.

² In a study of 135 farms in the high plains of Texas, a total of 95% of all cotton was harvested by "snapping." U. S. Department of Agriculture, *The World Cotton Situation, Part II, Cotton Production in the United States (Preliminary)* (Washington, Mimeographed, 1936), p. 25.

The average man-hours per acre of cotton were 25 in Texas, of which 12 were for snapping, compared with a total of 112 man-hours per acre in South Carolina, and 47 for picking. *Ibid.*, p. 24.

Snapping increases ginning costs because of the additional amount of foreign material which must be removed. The additional ginning of snapped cotton sometimes affects the preparation and character of the cotton to the point where some mills refuse to use snapped cotton.

³ When cotton is picked from the boll, approximately one-third of its weight is lint cotton and two-thirds is the cottonseed, later removed by ginning. A bale of cotton of 478 pounds net weight is the equivalent, therefore, of 1,434 pounds of seed cotton picked in the fields.

Cotton farming has never been mechanized to the extent of wheat farming. Some of the reasons for this lack of mechanization are the small size of the average cotton farm, the hilly terrain of a large section of the cotton belt upon which large machinery could not be operated efficiently, the low cost of manual labor, and the lack of an efficient cotton-picking machine. In the more recently developed cotton-growing regions of Texas and Oklahoma, tractors and cultivating machinery are used more extensively than in the eastern part of the Cotton Belt. A satisfactory commercial solution to the problem of reducing the amount of manual labor required to harvest the crop, however, has not yet been worked out.

With the bottleneck of cotton production coming in the picking season a tantalizing inspiration to inventors has existed for generations. The first patent for a cotton-picking machine was granted in 1850, and since 1865 a patent for some device for the harvesting of cotton has been granted in every year except 1899, the total on the records of the United States Patent Office now exceeding 900.¹ These inventions have ranged all the way from the simple "sled," which strips leaves, bolls, and cotton from the plant, to the more recent and widely publicized Rust Brothers' Cotton Picker that uses a number of moistened rotating spindles to which the cotton adheres as the machine passes over the cotton field. The success of a mechanized cotton picker depends not only on its mechanical efficiency for picking clean cotton but also on the size of investment required to purchase it, the yield per acre of the cotton picked, the topography of the land, and the rate of pay of a substantial number of casual laborers drawn from near-by towns during the harvesting season. High prices for cotton would obviously accelerate the demand for such a picker, but the social, political, and economic impact of its introduction on a large scale would be world-wide. It is likely that such a picker would be of more importance to the newly developed cotton-growing countries such as Brazil or Argentina, where cotton fields could be laid out so that mechanical equipment could be used throughout the growing and harvesting of the crop.

¹ U. S. Works Progress Administration, Studies of Changing Techniques and Employment in Agriculture, Report No. A-2, *Mechanical Cotton Picker*, by Roman L. Horne, and Eugene G. McKibben (Philadelphia, August, 1937), p. 5.

The development of a satisfactory cotton picker and its acceptance would upset the present landlord and tenant arrangement in the South, since fewer laborers would be required to harvest cotton. A serious social problem would result, and the transfer of this labor to other agricultural pursuits would cause repercussions throughout the country, particularly if other cash crops were started on marginal lands. The substantial increase in production of cotton in other countries stimulated by a low-cost cotton picker might result in the loss of some of the markets using cotton from southern farms. The displacement of these acres and the resulting loss of income would affect the entire economic structure of the South.

It does not seem likely, at present, that the cotton picker, at least in its present state of development, will receive widespread acceptance in the South. The financial outlay will be high for such a picker, probably exceeding the average yearly income of the cotton farmer.

The labor that such a machine would displace, furthermore, is not all "cash" labor, since much of the picking is done by the family of the farmer, including the small children. There would be no saving in buying a mechanical picker to perform work for which the farmer does not have to pay cash. Furthermore, chopping cotton is also a selective process, and laborers are needed to perform this task each year. If they must be supported for this job, they will be available also for picking cotton. The other pickers, who in the Southeast include the cooks, servants, handy men, and loafers from the neighboring villages, are only casual employees looking for a temporary job to provide them with a small amount of extra cash. Even if the picker were accepted and wage rates for this group declined substantially as a consequence, it is probable that many of them would continue to pick a little cotton for pin money. Large quantities of cheap or free labor will prove to be a great obstacle in the way of the mechanical cotton picker.

The mechanical operation of the picker must also be perfected before the picker is accepted. Cotton bolls do not mature at the same time, and a mechanical cotton picker must be somewhat selective. The combine can harvest wheat even if all the heads are not entirely ripe, but if a cotton picker collects

immature bolls and other trash the grade of the mature cotton is affected.

FINANCING THE PRODUCTION OF COTTON

From seed to cloth, cotton is financed many times, but most lengthy and important is the financing of the growing crop. Fertilizer, a food for the cotton plant, and "furnish," or food for those who raise cotton, constitute the principal items of expense requiring long-term credit. The planter having a large group of share croppers dependent upon him must borrow from the banks, from government agencies, or from large mercantile establishments to supply a living to those who will raise his cotton. The planter on a smaller scale, whether tenant or owner, also requires financial assistance during the growing season.

Sources of financial assistance have changed with the times. Before 1920 the cotton "factor" was an important personage in the country markets. This functionary financed the farmer's growing of the cotton and also the selling of the farmer's cotton through the factor's office. The activities of the boll weevil and the declining prices of cotton caused the ruin of many factors, and their importance has declined considerably in recent years. Country banks also gave important financial help to growers. In 1923 it was estimated that they supplied half the needs of the growers in the South Atlantic and South Central states and from 70% to 90% of the growers' needs in Texas and Oklahoma.¹

In the South Atlantic states and in eastern Texas, the local mercantile store finances a substantial part of the credit needs of the growers. These stores are frequently financed by the local banks. The small grower is unable in most cases to secure direct loans from the bank, but can buy goods on credit from the mercantile store. The store insures itself against losses by selling goods on credit at prices substantially higher than those of goods sold for cash. This price differential is justified because the services performed are many and the risk is great.² The com-

¹ U. S. Federal Reserve Board, *Financing the Production and Distribution of Cotton* (Washington, Government Printing Office, 1923), p. 19.

² The amount of credit extended to the farmers during a single crop year does not usually have a set limit and for a particular account may run far beyond the amount which should be extended. One of the largest mercantile stores in this business in the South wrote as follows in a letter to one of the authors:

"In the Spring of the year we practically 'adopt' about four or five hundred families of the tenant class and have to do everything for them from giving them a

missary of the plantation owner takes the place of the mercantile store in the Mississippi Delta. This commissary is a warehouse from which the owner draws supplies to advance to his share croppers during the growing season. In a court decision in Mississippi, in 1938, a plantation owner was convicted of charging usurious interest rates of more than 20% and was ordered to turn back both principal and interest to the debtor.¹ This decision probably will result in some lowering of interest rates in the future, or at least in replacing flat annual charges by more accurate calculations of interest charges on the basis of the time for which the credit is extended.

As in other sections of the country, a number of rural banks failed in the depression years between 1929 and 1933. The number of state and national banks in the cotton states reporting to the Comptroller of the Currency declined from 5,108 on June 29, 1929, to 2,929 on June 30, 1933.² As a result, the banking credit available to farmers was sharply curtailed. With the advent of the Farm Credit Administration, credit was available to the cotton farmers through the Production Credit Associations. Many tenants, however, were unable to present credentials indicating that they were satisfactory credit risks to the Production Credit Associations, and continued to be financed by the mercantile stores. The number of bank loans declined, but credit from this source continued to be available to farmers who were good credit risks. As a consequence, the financing of cotton growers through government agencies was on a much smaller scale than the financing of livestock producers.³

dose of castor oil to burying them. They are like a bunch of dumb animals that have to be cared for; we have to do their thinking and all of the time they are trying to see how much they can 'beat out of us.' Of course, that is just one class; there are others who are much more intelligent but of the same caliber so far as honesty is concerned, and still another class which comes under the head of 'good customers.'

"The 'time business' has to be figured on a three to four year basis rather than each year. We carry accounts for several lean years and collect in the good years (if we ever have any). It is impossible to know the value of a growing crop, and consequently, we never know just how much collateral we really have until it is too late. We furnish mostly 'rations,' clothes, fertilizer, implements, etc., but quite often it is necessary to furnish some money to help with the working of the crop. Once you have started furnishing a man, you have practically assumed entire responsibility for him and his crop; consequently a number of unexpected things happen which make it necessary to extend him more credit than was originally expected."

¹ *Taylor v. Copeland*, 181 *Southern Reporter* 742.

² *U. S. Federal Reserve Bulletin*, January, 1930, p. 46, and January, 1934, p. 52.

³ See Chapter III, The Meat-packing Industry.

COTTON GINNING

Before cotton enters its marketing channels, it must be processed to the extent of removing the cotton lint from the seeds. Since seed cotton is bulky and two-thirds of its weight is seed, the gins are usually placed in close proximity to the cotton fields, and the farmer hauls his seed cotton to the gin in an open wagon. He there awaits his turn for the operator to stick the nose of a pneumatic flue into his wagon, the cotton being transported by this means into the hoppers above the gin stands. The cotton then falls through beaters and fanners into the gin. The gin still operates on the principle invented by Eli Whitney in 1793. The edges of a number of circular saws pass through slits in a frame and pull the lint through the opening, the seeds remaining on the opposite side.¹ The lint is drawn by suction into the condenser, where the cotton is formed into a loose lap which is folded into the press box. These cotton laps are tamped down under great pressure every 30 seconds, and when the box is full and the cotton properly compressed, burlap is wrapped around the cotton and six steel bands are fastened around the bale. In a modern double battery gin containing five 80-saw gin stands on each side, a bale of cotton can be ginned in five minutes.

Prices for ginning vary from 25 to 40 cents a hundred pounds of seed cotton, and an extra charge of a dollar or more is made for the materials required in baling. The farmer usually sells all his seed to the ginner, except enough for planting the following year; the cost of ginning is deducted from the amount due the farmer. The net return to the average farmer for cottonseed in the years 1923-1936 was estimated to have been \$25.01.² The return from the sale of seed is quite important to the producer, since it is customary in the South to exempt cottonseed from the liens held on the farmer's crop as security for advances during the growing season. Frequently the return from seed is the only cash the farmer receives for his crop.

The hulls of the seed are fed to cattle; the linters adhering to the seed are used among other things for cellulose products and

¹ The tale is told that Whitney conceived this scheme on a visit to the South after witnessing a fox clawing at a chicken through a wire fence and securing only a mass of feathers.

² Hamilton, Walton, and Associates, *Price and Price Policies* (New York, McGraw-Hill Book Company, Inc., 1938), p. 225.

upholstering; and the kernel of the seed is pressed and ground for the oil it contains.¹

It has been estimated that there are 12,625 active cotton gins in the United States.² In the eastern section of the Cotton Belt the gins are usually owned and operated by an individual, but in the western section the gin is often owned by a cottonseed oil mill, in order to secure, for crushing, the cottonseed purchased by the gin. In turn, some of the oil mills are owned by large companies such as Swift & Company, Wesson Oil & Snowdrift Company, and Procter & Gamble, which use the oil for their products. In the western section of the Cotton Belt the ginner frequently buys the cotton from the farmer. This practice is not so common in the central and eastern sections where the individual ginner usually does not have the capital for such large purchases.

In the state of Oklahoma cotton gins have been regulated as public utilities since 1915, and ginning prices are set by the Corporation Commission. There are a number of cooperative cotton gins in Oklahoma, and it was estimated that these gins processed 21% of the 1933 cotton crop in Oklahoma.³

MARKETING OF THE COTTON CROP

It is difficult to trace with clarity the progress of a bale of cotton from the platform of the gin to the receiving department of a textile mill, but Diagram A may be of some assistance in visualizing the alternative channels of distribution. As may be seen from the diagram, in some cases the two places are near enough to each other for the farmer's wagon to be the only vehicle required to transport the cotton from the gin to its destination, and in other cases, it is necessary for the cotton to travel by truck, train, and boat halfway around the world before it reaches the spinner.

In this country there are four principal types of cotton markets: the country markets, the central or concentration markets, the mill or spinners' markets, and the futures markets. The first three classifications are known as spot markets, since title to specified bales of cotton for immediate delivery is passed between buyer and seller. Distinctions are not sharp, one type of market

¹ See section entitled "The Cottonseed Oil Industry," p. 157.

² Hamilton, Walton, and Associates, *op. cit.*, p. 223.

³ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 12, *Cooperative Cotton Gins in Oklahoma 1933-34*, by O. T. Weaver and O. W. Herrmann (Washington, Government Printing Office, 1937), p. 5.

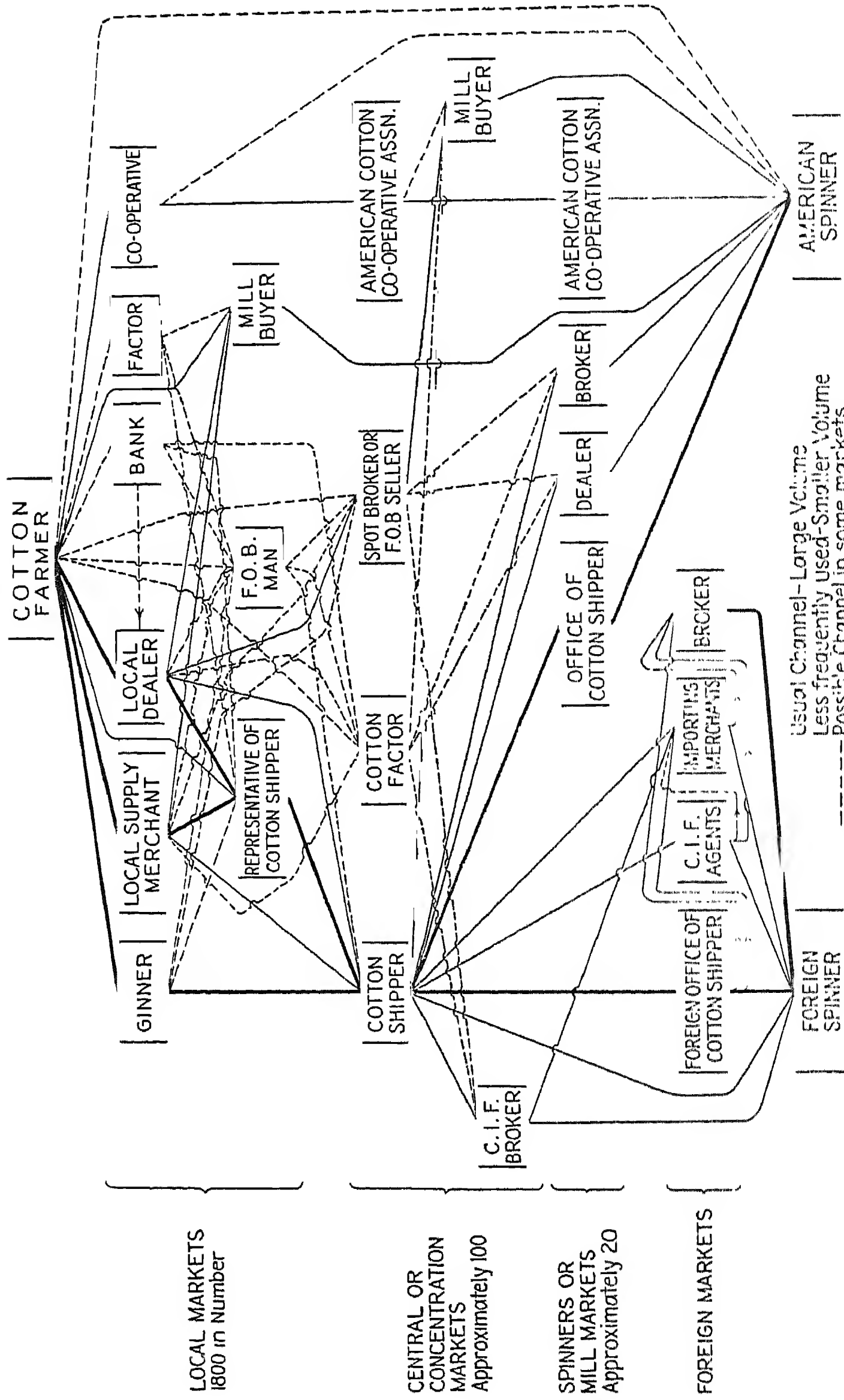


DIAGRAM A.—Alternative methods of marketing cotton.

shading into another, and in some parts of the Southeast a market may have the characteristics of all three types. In the futures markets a commitment is made to deliver cotton in a specified future month.

There are approximately 1,800 country or primary markets in the United States. The gins are near-by, and after the cotton has passed through this first process, unless the farmer has sold his cotton to the ginner, he takes it to a cotton yard (an outdoor storage space) or to a cotton warehouse (called a compress if the warehouse has compress machinery¹). There are approximately 2,800 public warehouses for the storage of cotton in this country, and of these 350 are compresses. Some of the large shippers such as Anderson, Clayton & Co. and Geo. H. McFadden & Bro., operate their own warehouses and compresses. Sometimes the buyer takes a sample of the cotton while it is on the farmer's wagon, and if the transaction is completed, accepts delivery then and there.

The ginner, the local supply merchants, the local dealers, and the cooperatives buy cotton directly from the farmer and sell it, frequently on the same day, to the local representative of the cotton shipper,² the mill buyers, or to an f.o.b. man. The factor and the country bank are less important functionaries in the local market. The shippers' representatives, the mill buyers, and the f.o.b. men also purchase some cotton directly from the farmer, but it has been estimated that 75% of the cotton crop each year passes through the hands of the local supply merchants, the local dealers, the ginner, the local factors, and the banks.³ The remaining 25% is sold direct to shippers, to mills, through f.o.b. men and spot brokers, and through cooperatives. Approxi-

¹ Cotton is taken to the warehouse for convenience, since warehouse receipts are negotiable, and in addition, the cotton may have to be compressed if it is to be shipped any distance. When the bale leaves the gin, it is approximately 54 by 27 by 48 inches, with a density of approximately 12½ pounds to the cubic foot. If, however, the bale is destined for domestic consumption in markets a considerable distance away, it is compressed to a "standard density" bale of 60 by 30 by 19 inches, and if it is to be exported, the bale is reduced to "high density" and a size of 60 by 20 by 18 inches. In the trade the original bale as it comes from the gin is the "flat" bale and the standard density is the "square" bale. The reduction in size permits savings in freight charges. A few gins are equipped to compress the round bale, weighing about 250 pounds and destined for the export markets. This bale needs no further compression after being prepared at the gin, and is produced only for Anderson, Clayton & Co., for sale in foreign markets.

² For a further description of the cotton shipper, see p. 155.

³ Garside, *op. cit.*, p. 176.

mately 10% to 15% of the annual cotton crop is handled by cooperatives.¹

The local buyers, such as the local dealer and supply store, perform the function of collecting from one to five bales from a farmer and selling in larger quantities to other buyers. The supply store is an important part of the marketing process, particularly in the Southeast, where so much of the financing of the growing of the crop is performed by the store. In the Mississippi Delta, where plantations are larger, the supply store is not so important; the farmers sell to cotton shippers' representatives or local dealers and sometimes ship or sell in Memphis and other central markets. In Texas and Oklahoma the ginner is a more important functionary in the local markets, acting as buying representative for a cotton shipper and receiving daily offering price quotations. The local dealer is frequently a real estate or insurance man who buys cotton during the harvesting season, or he may be one who tries to make enough from his cotton deals to last him through the year. Sometimes a local banker buys cotton on his own account. These local dealers rarely keep the cotton more than 24 hours but sell to a representative of a cotton shipper, a mill buyer, or some other buyer accumulating cotton in larger quantities.

The local bank buys cotton from the farmer but rarely and then only because it desires to sell the cotton to secure repayment for a loan. The banks are important, however, in financing the marketing of cotton in the country markets, particularly in furnishing funds to the supply stores, to the local dealers, and to the gins. The factor is now little used.

The cotton cooperatives have become more important in the marketing of cotton during recent years. These cooperatives are usually state or regional in scope although there are a few local cooperatives. The percentage of total ginnings handled by the large-scale cooperatives has increased from 6.8% and 6.4% in the 1926-1927 and 1927-1928 seasons to 13.8% in 1933-1934, and 17.5% in the 1934-1935 season.² The local cooperatives handle an estimated 2% of the total ginnings of the country. The large-scale associations maintain contact with their members through 437 interior classing offices where cotton is classed when it is

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, *Cooperative Marketing of Agricultural Products*, by Ward W. Fetrow (Washington, Government Printing Office, 1936), p. 10.

² U. S. Farm Credit Administration, Bulletin No. 3, Table 3, p. 10.

delivered, and payment or advances are made to members. The large-scale cooperatives organized in 1930 the American Cotton Cooperative Association, which sells and finances the cotton received from the member associations.¹ Domestic sales are made direct to mills. This cooperative also reconcentrated and classed the government loan cotton that was accumulated in its cotton production adjustment operations.²

The local representative of the cotton shipper is frequently paid a salary, although he may be paid a commission for the cotton he handles. Some of the southern cotton mills are located in sufficient proximity to the local markets to buy direct from farmers, and some of the larger mills buy cotton in the local markets for shipment direct to the mills. The f.o.b. man, whose terms are f.o.b. the country point, or the interior compress point, as the case may be, owns the cotton he handles and must make his profit from the difference in his buying and selling prices. He sells to a large shipper or to some other person in the central markets.

There are approximately 100 central or concentration markets where the cotton is warehoused or assembled for shipment abroad or to mills in this country. Such cities as Houston, Dallas, Memphis, New Orleans, Mobile, Montgomery, Wilmington, and Charlotte are central markets. In most of the central markets there are warehouses and compresses, railroad and ocean shipping facilities, and a cotton exchange. The exchange reports the prices of the various transactions which take place in the offices of the buyers and sellers throughout the city. Such exchanges differ from the New York and New Orleans futures exchanges not only because few transactions take place on the floor of the exchange itself, but also because the purpose of the sale is to transfer title to spot cotton, and for this reason the terms of the sale contracts are different. The average of the prices in 10 of these markets³ is used to determine the premium or discount on cotton delivered

¹ The North Carolina Cotton Cooperative Association does its own assembling and selling. The Staple Cotton Cooperative Association, which is not a member, handles the long staple cotton of the Mississippi Delta region. For a more complete description of this latter organization, see Malott, Deane W., *Problems in Agricultural Marketing* (New York, McGraw-Hill Book Company, Inc., 1938), pp. 208-212.

² See p. 175.

³ Norfolk, Augusta, Savannah, Montgomery, New Orleans, Memphis, Little Rock, Dallas, Houston, and Galveston.

on futures contracts of the New York Cotton Exchange, in cases where the grade and staple of the cotton delivered is different from the $\frac{7}{8}$ -inch middling grade specified in the futures contracts. The sellers in these central markets include the cotton shipper, the cotton factor, and the spot broker or f.o.b. seller. The American Cotton Cooperative Association has offices in many of these markets. The buyers are the c.i.f. brokers, representatives of foreign firms and mills, cotton shippers specializing in exports, and the mill buyers.

The cotton shipper or merchant, whose activities will be described below, is an important functionary in the central markets. Since the shipper buys cotton to be held throughout the season, much of his cotton is stored in these concentration markets awaiting shipment to mills in this country or abroad. The cotton factor in the central markets functions in a similar manner to the factor in the local markets and, like the latter, secures cotton for sale on commission as a result of financial assistance extended during the growing season. Loans are made to large growers and to local dealers, loans to the latter being extended to finance the purchase or holding of cotton at country points. Some cotton is handled by the factor for local supply merchants and banks. From the standpoint of volume of operations the factor is not an important personage in the central markets. The spot brokers sell on commission the cotton held at country points by local dealers, ginner, supply merchants, and large growers. The c.i.f. brokers buy cotton at a price which includes cost, insurance, and freight to the destination in a foreign country.

The spinners' or mill markets are those markets near which mills are located or where buying offices are maintained. Such markets as Gastonia, Charlotte, Spartanburg, Greenville, and Atlanta in the South, and Boston, Fall River, and New Bedford in New England are spinners' markets. The principal sellers in the spinners' markets are the cotton shippers, the cotton dealers, the brokers, and the cooperatives. The cotton broker is sometimes called a spot broker and sells cotton on commission for shippers who do not have offices in that market. In New England the so-called "broker" acts as principal and is responsible for the delivery of the cotton to the mill, although he does not carry large stocks of cotton on his own account. To all intents and purposes, however, he is actually a dealer and not a broker.

In the foreign spinners' spot markets for American cotton, such as Liverpool, Havre, Bremen, Milan, Shanghai, and Osaka, the principal cotton sellers are c.i.f. agents, importing merchants, brokers, and the foreign branch offices of the larger cotton shippers. The c.i.f. agents sell on a commission basis, buying from cotton shippers in the United States and selling to mills and other buyers. The importing merchants act as principals, buying from the c.i.f. agents unless they have offices in the United States. The brokers buy for the mills on commission, purchasing from the other sellers in the market.

The futures markets, where contracts for future delivery of American cotton are bought and sold, are in New York, New Orleans, and Chicago, in this country, and Liverpool, Havre, Bremen, and Osaka, in other countries. The New York Cotton Exchange is the largest, and practically all the spot cotton bought or sold in the United States is bought in terms of points on or points off the prevailing price on the New York Exchange.¹ Futures contracts in New York may be purchased, calling for delivery in the current month or any one of the following 11 months, although January, March, May, July, October, and December are the most active trading months. The basic contract is for 50,000 pounds gross weight in about 100 square bales. Delivery may be made any time during the first three weeks of the contract month at any one of the eight ports, New York, Norfolk, Charleston, Savannah, Mobile, New Orleans, Houston, or Galveston. The price in futures trading is based on $\frac{7}{8}$ -inch middling cotton, although other grades and staples may be delivered.² The premium paid by the buyer for any grade better than middling and the discount allowed for grades lower than middling are calculated on the basis of the differentials in prices for such grades in the 10 designated southern spot markets previously mentioned. The premium allowed for extra staple cotton up to one inch is 60% of the additional value above $\frac{7}{8}$ -inch staple calculated from the prevailing prices in the 10 spot markets.

¹ This statement should not be interpreted to mean that because of this practice the futures market "sets" the price. Obviously, the futures prices reflect the prices paid in local spot markets here and in other countries, and the two prices are mutually dependent. In the mechanics of setting a price for the thousands of transactions in spot cotton, it is customary to quote points off and on New York prices for the particular delivery month chosen.

² Effective August 15, 1939, a new contract for $1\frac{5}{16}$ -inch staple cotton was established on the New York Cotton Exchange. After the expiration of current contracts for $\frac{7}{8}$ -inch staple, all futures contracts will be based on $1\frac{5}{16}$ -inch staple cotton.

Representatives of the New York Cotton Exchange supervise the sampling and weighing of all cotton submitted for delivery on futures contracts. Warehouses are licensed by the exchange for use in storing the cotton, and the transfer of warehouse receipts constitutes the delivery of the cotton. All cotton delivered on contracts on the exchange is classed by at least two licensed experts of the Bureau of Agricultural Economics of the United States Department of Agriculture; in case of disagreement a third expert is called in.

Trading in the other futures markets is similar to that on the New York Exchange. In the case of the foreign futures markets, delivery is usually required in the same city in which the futures market is located. Also, in Liverpool futures may be bought and sold for two years in advance, and contracts may be made for delivery in any one month of a consecutive 25-month period.

No precise figures are available as to the proportion of transactions on the New York Cotton Exchange initiated solely as commercial transactions and those initiated for speculative purposes. The consensus of the trade is that the latter is far less important than the former, probably accounting for less than 20% of the total volume of business. The percentage of speculative transactions varies, of course, from season to season. Trade transactions are principally hedging as a protection against price changes; consequently, very few actual deliveries of cotton are made. The Commodity Exchange Administration reported that deliveries on October contracts during 1937 were the largest made on any contract in the last six years. Total deliveries were 74,924 bales, or less than 1% of the total volume of trading in this contract, which amounted to 8,190,800 bales.¹

The cotton shippers use the futures market to hedge against price changes for all transactions except in the very poor grades of cotton, for which differentials are large. Furthermore, the price relationship with the futures market is not so exact for these grades as for better grades of cotton. These merchants buy and sell by quoting points on and off the New York market, and each transaction is hedged as soon as the price is fixed. Other buyers and purchasers use the futures markets, as do some of the cotton mills.²

¹ U. S. Department of Agriculture, Press Release 920-38, Dec. 6, 1937.

² See p. 195.

There are approximately 300 cotton shippers in this country, and they handle on the average approximately 80% of the cotton crop.¹ These shippers perform the services of buying the cotton in country markets, classing it in even-running lots, storing, compressing, financing, and holding it until the spinners are ready to buy and use it. Frequently they guarantee before harvest the delivery of certain grades and staples of cotton at specified times in the future. These shippers' business facilities vary in size from a single office in a very small territory to offices throughout the world such as those of Anderson, Clayton & Co. and Geo. H. McFadden & Bro.²

Compared with the amount of their working capital, the gross business done by the shippers is tremendous. It is not unusual for a shipper to handle during a single season cotton having a value of 40 times his working capital. It is obvious, therefore, that such shippers cannot take the risks of price changes, in view both of the large volume and the small margin which are characteristic of their business. As a consequence, transactions are meticulously hedged and the risk considerably although not completely reduced.

Since practically all the shippers' transactions are hedged, and each purchase or sale of cotton is protected simultaneously by the sale or purchase of an equivalent amount of futures, the shipper quotes prices in terms of the prevailing price on the futures exchanges. The differential or spread between the spot cotton prices for cotton purchased or stored at country points or elsewhere in the marketing channels and the price per pound of cotton quoted for future delivery on some futures exchange is called the "basis." All the shippers' transactions are quoted in terms of the basis. The variation in quality, the location, and the time of delivery make the spot cotton worth more or less than the futures contract price on the New York Cotton Exchange. In the country market the shipper will bid for the cotton, for example, at 40 points off the price for New York December futures. At the same time he will sell New York December futures in an amount

¹ Cooperatives and mills buying direct from growers or dealers in the country markets handle the remaining 20%. Garside, *op. cit.*, p. 188.

² In the ten years from 1925-1926 to 1934-1935, Anderson, Clayton & Co. handled an average of 13.8% of the total American production, and from 1928-1929 to 1934-1935 Geo. H. McFadden & Bro. handled an average of 7.3%. U. S. Senate Committee on Agriculture and Forestry, *Hearings to Investigate the Causes of the Decline of Cotton Prices*, Seventy-fourth Congress, Second Session, Part I (Washington, Government Printing Office, 1936), pp. 14, 15, and 489.

equivalent to the spot cotton purchased. In selling to a spinner, the shipper will quote a price, for example, of 85 points on New York December futures. The difference between 40 points off and 85 points on equals 125 points, which is the shipper's gross margin from which he must deduct freight and all other charges and secure his profit. If the sale is made to the spinner, a futures contract is bought and the futures commitment is closed out. It makes no difference to the shipper what changes may have occurred in the prices quoted on the futures exchange, since his sale is made by quoting a definite number of points on the New York market. If the futures price has gone up, his spot cotton has gained in value, but since he has sold a futures contract equal to the amount of his spot cotton, he loses an equivalent amount. If the futures price declines, the gains on his futures sale (which he can buy back at a lower price) are offset by the decline in total value of his spot cotton. Therefore, the shipper is interested only in the basis, and his risk is limited to variations in the relation of the spot price to the futures price.

If the shipper finds that he can get only 70 points on New York for his mill-delivered cotton and he has purchased his cotton at 40 off, his spread is only 110 points, which probably will not cover his expenses. He is, therefore, vitally interested in this spread. The services which he performs and which justify this spread are the collection of cotton at country points; the classing of the cotton so that the mill may secure 100 bales of cotton of precisely the same staple, grade, and quality; the financing, insurance, and storage of the cotton until the spinner is ready to use it; and the transporting of the cotton to the mill on the date specified. The influences which may cause the basis to move up and down (in other words, the spread or differential increases or decreases) are the relative supply of and demand for particular staples and grades, not only throughout the country, but in a particular place at a certain time, and the large or small premiums or discounts on staples and grades which can be substituted for the cotton the shipper is trying to sell. Consequently, the shipper is not assured of a profit by hedging, but he limits the extent of his commitment and at the same time makes possible the opportunity for a profit.¹

¹ Some excellent examples of the transactions of a cotton shipper in buying and selling cotton are given in Garside, *op. cit.*, Appendix I, pp. 377-386.

The financing of the cotton through the various marketing channels is done principally by banks. Since the cotton shippers hedge every move, banks are willing to finance the purchasing and holding of cotton. From the time the bale of cotton is sold by the farmer, it travels on bank credit in the form of either sight drafts or advances for working capital, with warehouse receipts as collateral.

THE COTTONSEED OIL INDUSTRY

Only one-third of the average weight of the seed cotton harvested by pickers throughout the South in the fall of each year can be used by the cotton-textile industry to produce yarn and cloth; the remaining two-thirds of the weight of this cotton consists of the seed, most of which was formerly thrown away as worthless. The seed is separated from the lint at the gin, and the two products are then marketed through different channels.

The seed, except for that retained by the grower for planting the following season, is usually sold to the ginner. Of the total amount of seed separated by the cotton gins of this country, approximately 80% is crushed, 10% retained by the farmers for seed, and the remaining 10% is wasted or used without further processing as fertilizer or feed. The production of cottonseed, the amount crushed, and the production of cottonseed products from 1920 to 1938 are shown in Exhibit 5.

The four principal products produced from cottonseed are oil, meal and cake, hulls, and linters. The oil is extracted by heating and pressure and, after refining, is used in shortening, salad dressing, and in the production of oleomargarine. The meal and cake, which constitute the protein residue of the seed after the oil is extracted, are used as fertilizer and as feed for livestock. The hulls, which enclose the kernels, are fed to cattle as roughage. Linters, the short cotton fibers still remaining on the seed after ginning, are cut from the seeds in the cotton-oil mills and used as filling for upholstering, as mattress stuffing, and as raw material in the production of cellulose products.

In the season ending July 31, 1938, the total value of cottonseed products manufactured in this country amounted to \$212,197,000. Of this amount, the value of the oil produced was \$121,510,000, or 57% of the total; the value of cake and meal was \$62,843,000, or 30% of the total; the value of hulls was \$8,917,000,

or 4% of the total; and the value of linters was \$18,927,000, or 9% of the total.¹

In the season ending July 31, 1938, there were 466 oil mills crushing cottonseed, of which 151 were in Texas.² These mills purchased seed from the gins or received seed from cotton gins which they owned. In 1929, 9% of the gins in the principal

EXHIBIT 5
PRODUCTION OF COTTONSEED AND COTTONSEED PRODUCTS IN THE
UNITED STATES, 1920-1938

Year	Cottonseed		Cottonseed products*			
	Produced† (in thou- sands of tons)	Crushed* (in thou- sands of tons)	Oil (in millions of pounds)	Cake and meal (in thousands of tons)	Hulls (in thousands of tons)	Linters (in thou- sands of running bales)
1920	5,074	4,013	1,211	1,817	1,143	595
1925	6,051	4,605	1,404	2,126	1,331	858
1930	6,590	5,016	1,572	2,232	1,384	1,038
1935	4,282	3,550	1,109	1,614	913	805
1936	4,729	3,818	1,164	1,739	988	876
1937	5,511	4,498	1,364	2,031	1,144	1,127
1938	8,246	6,325	1,966	2,830	1,625	1,472

* Season ending July 31.

† Crop of previous year.

Source: U. S. Bureau of the Census, Bulletin 174, *Cotton Production and Distribution* (Washington, Government Printing Office, 1937), p. 54. 1938 figures from current reports.

cotton producing states were owned by oil mills; and in 1934, the Wesson Oil & Snowdrift Company owned 117 gins.³ Mills make contractual agreements with gins concerning the purchase of seed and frequently extend financial assistance to insure an adequate supply of seed for the mill. The cottonseed oil refiners, who purchase the crude oil produced by the mills, include, in addition to the Wesson Oil & Snowdrift Company, Procter & Gamble Company, and Swift & Company.⁴ All three of these companies

¹ U. S. Bureau of the Census, Bulletin 175, *Cotton Production and Distribution* (Washington, Government Printing Office, 1937), p. 52.

² *Ibid.*, p. 43.

³ Hamilton, Walton, and Associates, *op. cit.*, p. 230.

⁴ Under the Packers' Consent Decree, ownership of the Swift interest in cottonseed oil refining companies was placed in the hands of a trustee with instructions that this interest be sold when a satisfactory price could be secured. This had not been sold by the summer of 1938, when the Swift interests were permitted to acquire an additional refinery.

own mills to provide crude oil for their refineries. There are also other chains of mills, operating independently of the refiners, that own mills located over a wide area. In 1931 the 10 largest groups of mills, including the refinery-owned mills, operated 45% of the total capacity of the industry.¹

The cotton-oil mill produces the four principal cottonseed products. When the seed arrives at the mills it is subjected to a cleaning process, and the short fibers adhering to the seed are then cut off to produce linters. After the hull is removed by machinery from the kernels of the seed, the kernels are put in large kettles and cooked. The cooked material is then put in cloth containers and placed in a hydraulic press which forces out the crude oil by tremendous pressure, and the residue remaining in the cloth, known as cake, is cooled. This material is either sold as cake or ground into fine particles and sold as meal.

The crude oil is shipped to the refineries where the oil is cleansed of impurities. The five principal refining companies are Swift & Company, Armour & Company, Southern Cotton Oil Company (a subsidiary of Wesson Oil & Snowdrift Company), Procter & Gamble Company, and Wilson & Company. In 1933 these five companies produced 87% of all the vegetable shortening manufactured in this country.² Approximately 70% to 80% of the total production of cottonseed oil is used in the manufacture of vegetable shortening.³ The remainder of the oil is used in the manufacture of cooking and salad oil, oleomargarine, and soap.

Futures contracts for the delivery of cottonseed oil are bought and sold on the New York Produce Exchange and the New Orleans Cotton Exchange. The former is the more important of the two and uses as a unit of trading a 60,000-pound tank of bleachable prime summer yellow oil, the principal product of the refineries. Cottonseed and cottonseed meal futures are purchased and sold on the Memphis Merchants Exchange.

CONSUMPTION OF COTTON

Although no exact data are available, it has been estimated that two-fifths of all textile fibers are used in the making of wearing

¹ Hamilton, Walton, and Associates, *op. cit.*, p. 236.

² *Ibid.*, p. 276.

³ *Ibid.*

apparel, two-fifths for agricultural and industrial purposes, and the remaining one-fifth for various types of household uses.¹ Cotton is by far the most important textile fiber in this country, constituting approximately 75% of all textile fibers utilized by United States mills. In 1934 the total use of textile fibers processed by mills in the United States was divided as follows: cotton, 74.0%; rayon yarn, 5.5%; raw silk, 1.7%; scoured wool, 4.7%; and raw jute, jute yarn, and fabric, 14.1%.² This distribution compared with an average of the years 1929-1933 for the world textile industry as follows: cotton, 58%; rayon, 3%; silk, 2%; wool, 11%; jute, 15%; flax, 1%; and various other fibers, 10%.³

Cotton has maintained its relative position in comparison with other textile fibers principally because of the new uses for cotton for industrial, agricultural, and household purposes which have developed in the past 30 years. The automobile, building, electrical, and furniture industries have used increasing quantities of cotton in recent years. The production of automobile tires, automobile upholstery, and other products requiring large quantities of cotton has increased with the rapid expansion of the automobile industry. The use of cotton for clothing has declined considerably, principally because of changes in styles and tastes. The decline in the use of gingham, the decreased use of cotton stockings, the abbreviated forms of underwear, and the decline in popularity of sateens have contributed to a decrease in the amount of cotton required for clothing.

Rayon, which was first considered as a substitute for silk, has encroached rapidly on the markets which cotton had previously held exclusively. Rayon accounted for only 0.2% of the total fibers consumed by mills in the five years preceding 1920 but had increased to 5.5% in 1934.⁴ The percentage continued to

¹ U. S. Cabinet Committee on Cotton Textile Industry, *Cotton Textile Industry*, Senate Document No. 126, Seventy-fourth Congress, First Session (Washington, Government Printing Office, 1935), p. 86. The Textile Economics Bureau estimated that the 1937 consumption of cotton was as follows: clothing, 43%; industrial and agricultural, 37%; and household, 20%. Some members of the trade believe that these estimates of household consumption are too low and that a figure of 25% is more accurate.

² U. S. Cabinet Committee on Cotton Textile Industry, *op. cit.*, Table 35, p. 83.

³ International Institute of Agriculture, Studies of the Principal Agricultural Products on the World Market, No. 1, *World Cotton Production and Trade* (Rome, Villa Umberto 1, 1936), p. 329.

⁴ U. S. Cabinet Committee on Cotton Textile Industry, *op. cit.*, Table 35, p. 83.

increase in 1935 and 1936 although there was a slight decrease in 1937.

Rayon is used principally in women's wear fabrics; over two-thirds of the annual production goes into such fabrics. Considerably smaller amounts of rayon are used in men's wear fabrics and for household furnishings such as curtains and tablecloths. The industrial use of rayon has been slight in the past. In 1938, however, tires made from rayon rather than cotton yarn were introduced. It was claimed that the yarn in these tires had a greater resiliency at high temperatures than cotton yarn.

EXHIBIT 6
ANNUAL FIBER CONSUMPTION IN THE UNITED STATES
(In millions of pounds)

Year	Cotton		Wool		Rayon		Silk		Linen		Total	
	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%
1920	2,828.1	88.9	314.2	9.9	8.7	0.3	29.3	0.9	*	...	3,180.3	100
1921	2,595.3	86.5	343.4	11.4	19.8	0.7	42.5	1.4	*	...	3,001.0	100
1922	2,909.8	85.9	406.5	12.0	24.7	0.7	48.3	1.4	*	...	3,389.3	100
1923	3,121.1	86.2	422.4	11.6	32.6	0.9	47.2	1.3	*	...	3,623.3	100
1924	2,637.1	85.8	342.2	11.2	42.2	1.4	48.0	1.6	*	...	3,069.5	100
1925	3,074.7	86.6	349.9	9.9	58.3	1.6	66.0	1.9	*	...	3,548.9	100
1926	3,214.8	87.3	342.7	9.3	60.6	1.6	65.9	1.8	*	...	3,684.0	100
1927	3,587.7	87.2	354.1	8.6	100.0	2.4	72.0	1.8	*	...	4,113.8	100
1928	3,184.2	86.3	333.2	9.0	100.5	2.7	74.9	2.0	*	...	3,692.8	100
1929	3,422.7	85.5	368.1	9.2	133.4	3.3	81.3	2.0	*	...	4,005.5	100
1930	2,610.9	84.1	263.2	8.5	118.8	3.8	76.0	2.5	34.7	1.1	3,103.6	100
1931	2,656.6	82.2	311.0	9.6	159.0	4.9	77.3	2.4	28.7	0.9	3,232.6	100
1932	2,463.3	83.6	230.1	7.8	155.3	5.3	70.9	2.4	27.3	0.9	2,946.9	100
1933	3,052.5	83.0	317.1	8.6	217.4	5.9	59.8	1.6	31.4	0.9	3,678.1	100
1934	2,655.4	83.8	229.7	7.3	197.2	6.2	58.5	1.8	28.8	0.9	3,169.6	100
1935	2,754.7	78.4	402.5	11.5	258.7	7.4	62.3	1.8	31.5	0.9	3,509.7	100
1936	3,470.2	81.3	383.8	9.0	322.6	7.5	57.8	1.4	35.9	0.8	4,270.3	100
1937	3,657.1	83.0	353.3	8.0	307.9	7.0	53.6	1.2	35.5	0.8	4,407.4	100
1938	2,904.4	80.9	284.4	7.9	327.1	9.1	51.8	1.5	20.7	0.6	3,588.4	100

* No data available.

Source: *Rayon Organon*, Vol. 10, No. 3, Feb. 8, 1939 (Textile Economics Bureau, Inc.), p. 33.

The annual consumption of fibers used principally in clothing and in household furnishings is shown in Exhibit 6. The percentages vary from those given above, since jute, which is used principally for industrial purposes, is not included. The encroachment of rayon upon the markets held by cotton, wool, and silk is evident from the figures in this table.

Additional inroads in these markets may be made as the rayon industry improves techniques and introduces new synthetic fibers. The new Du Pont fiber introduced in 1938, which is reported to have the elasticity of silk, and the continuous spinning

machines of the Industrial Rayon Corporation, which began operations in December, 1938, are examples of the progress which may be expected.

A new type of rayon has come into prominence comparatively recently, known as rayon staple fiber, which is merely the rayon filament or yarn cut to a staple length approximately the same as the fiber with which it is to be mixed. Rayon filaments are produced in a continuous operation and wound on skeins, an expensive process. Staple fiber is cut and can then be spun on cotton spindles. While staple fibers or waste filaments have been used for some years, the substantial increase in the use of staple fibers has come since 1934. Since this date, both domestically produced and imported staple fiber has increased ten times. Although the total amount produced in 1937, 40,000,000 pounds, is still small compared with the total consumption of rayon filament yarn, which amounted to 312,000,000 pounds in the same year,¹ the trend is significant.

Consumption of American cotton throughout the world continued to increase until the 1929-1930 season, but consumption of foreign-grown cotton also increased steadily. The world consumption of cotton for the years 1913-1938 is shown in Exhibit 7.

Since the textile fibers can be substituted for each other for many uses, comparative prices determine in part the year-to-year fluctuations. Similarly, the use of American cotton by foreign mills depends to a great extent on the comparative price of cotton grown in other countries. For this reason the production and export of foreign growths are important factors in interpreting the position of American cotton in world markets.

FOREIGN TRADE IN COTTON

Cotton is the most important agricultural export of the United States, and for many years before the 1934-1935 season, this country furnished over one-half of the world's supply of cotton each year. When America was a pioneer country and development was financed by foreign capital, the exports of cotton built up credits abroad each year to pay the interest and return a part of the principal of these investments. With such a favorable balance of trade, cotton production in this country increased, and there was no problem of balance of payments. When the

¹ *Rayon Organon*, Statistical Supplement, January, 1938, p. 16.

United States became a creditor nation after the World War, however, the picture was changed, and it became more difficult for other nations to find funds with which to pay debts to the United States and also to pay for the annual imports of cotton from this country. One of the results of this new situation has

EXHIBIT 7
WORLD CONSUMPTION OF COTTON, 1913-1914 TO 1937-1938
(In thousands of bales)

Season	American*	Foreign†	Total	American percentage of total
1913-14	13,825	8,375	22,200	62
1914-15	13,249	7,422	20,671	64
1915-16	13,039	8,939	21,978	59
1916-17	12,561	8,548	21,109	60
1917-18	10,871	7,645	18,516	59
1918-19	9,909	6,796	16,705	59
1919-20	11,898	7,402	19,300	62
1920-21	10,268	6,637	16,905	61
1921-22	12,209	7,781	19,990	61
1922-23	12,449	8,876	21,325	58
1923-24	10,917	9,065	19,982	55
1924-25	13,311	9,331	22,642	59
1925-26	14,010	9,920	23,930	59
1926-27	15,748	10,121	25,869	61
1927-28	15,576	9,709	25,285	62
1928-29	15,226	10,556	25,782	59
1929-30	13,021	11,857	24,878	52
1930-31	11,113	11,289	22,402	50
1931-32	12,506	10,390	22,896	55
1932-33	14,405	10,581	24,986	58
1933-34	13,680	11,644	25,324	54
1934-35	11,206	14,282	25,488	44
1935-36	12,503	15,205	27,708	45
1936-37	13,093	17,898	30,991	42
1937-38	10,930	15,500	26,430	41

* Running bales.

† Equivalent bales of 478 pounds net weight.

Source: Compiled from U. S. Department of Agriculture and New York Cotton Exchange statistical figures.

been the increased production of cotton by countries other than the United States.

The six countries producing the largest amounts of cotton are the United States, India, Egypt, China, Union of Soviet Socialist Republics, and Brazil. The more important of the smaller countries are Chosen, Manchukuo, Mexico, Peru, Argentina, and the African colonies, Uganda and Anglo-Egyptian

Sudan. Production of cotton in recent years in the six most important countries is shown in Exhibit 8. This exhibit shows that whereas American production accounted for 56% of the total world production in the years from 1925-26 to 1929-30, the proportion of United States grown cotton was only 41% in 1936-37, and even with the largest crop in the history of the country in 1937-38 the United States total amounted to slightly less than 50% of the world total.

EXHIBIT 8

WORLD PRODUCTION OF COTTON, AVERAGE, 1925-1926 TO 1929-1930,
ANNUAL, 1935-1938
(In thousands of bales*)

Country	Average 1925-1926 crop to 1929-1930 crop	Crop year 1935-1936	Crop year 1936-1937	Crop year† 1937-1938
United States.....	15,268	10,638	12,399	18,946
India.....	4,724	4,965	5,278	4,867
Egypt.....	1,587	1,769	1,887	2,282
China‡.....	2,552	2,647	3,870	3,600
U.S.S.R.....	1,022	2,250	3,250	3,482
Brazil.....	504	1,765	1,749	2,205
World Total.....	27,158	26,500	30,200	38,359

* 478 pounds net weight.

† Preliminary for all countries except United States.

‡ Includes Manchuria.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 107, p. 91; *ibid.*, 1938, Table 117, pp. 98-99.

Not all these countries are exporters; the Union of Soviet Socialist Republics consumes nearly all its own production and China consumes most of its own production in addition to the amount imported from other countries. The United States, India, Egypt, and more recently, Brazil are the principal exporting countries competing for the world market. The exports of these countries are shown in Exhibit 9.

The principal countries importing cotton are the United Kingdom, Japan, Germany, France, Italy, China, Belgium, Spain, and Poland. These are also the most important countries of destination to which American cotton is shipped. The changes in exports of American cotton are reflected in Exhibit 10, and there is, of course, a separate story of many causes, effects, and relationships for the figures for each country.

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The exports to the United Kingdom and Germany declined substantially between 1929 and 1937, while exports to Japan increased. The increased exports to Japan and the decreased exports to the United Kingdom reflected the passing of supremacy

EXHIBIT 9
EXPORTS OF COTTON FROM PRINCIPAL PRODUCING COUNTRIES, AVERAGE,
1925-1929, 1930-1934, ANNUAL, 1934, 1935, AND 1936
(In thousands of bales)

Country	Average 1925-29	Average 1930-34	1934	1935	1936
United States.....	8,805	7,672	6,058	6,169	5,652
India.....	3,023	2,492	2,866	2,631	3,336
Egypt.....	1,480	1,510	1,775	1,773	1,618
Brazil.....	109	175	584	639	924

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 134, p. 113.

EXHIBIT 10
UNITED STATES COTTON* EXPORTS BY COUNTRIES OF DESTINATION,
1928-1929 TO 1936-1937
(In thousands of bales of 500 pounds gross weight)

Country	1928- 1929	1929- 1930	1930- 1931	1931- 1932	1932- 1933	1933- 1934	1934- 1935	1935- 1936	1936- 1937†
United Kingdom.....	1,918	1,306	1,108	1,314	1,520	1,412	787	1,431	1,226
Japan.....	1,373	1,071	1,233	2,396	1,717	2,060	1,605	1,585	1,600
Germany.....	1,891	1,770	1,752	1,629	1,907	1,477	382	804	683
France.....	841	860	986	487	895	799	383	731	698
Italy.....	765	705	498	673	833	722	500	414	410
China.....	245	232	393	1,143	352	366	163	38	15
Belgium.....	217	182	143	143	196	135	100	172	164
Spain.....	301	285	268	309	350	320	258	232	3
Poland and Danzig...	‡	‡	9	39	194	259	222	284	190
Total exports.....	8,520	7,096	7,048	8,989	8,647	8,366	5,066	6,397	5,722

* Excluding linters.

† Preliminary figures.

‡ Less than 500 bales.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 470, p. 347; *ibid.*, 1938, Table 540, p. 393.

from the Lancashire cotton mills, once the leading producers and exporters of cotton cloth of the world, to Japan. Before the World War the English cotton industry exported 75% of its production, but by 1930 Japan became the leading importer of

raw cotton, having captured many of the foreign markets formerly dominated by English mills. In 1933 Japan became the world's leading exporter of cotton fabrics. This change was significant to American cotton producers, for, although Japan soon became the leading user of American cotton, the proportionate consumption of American cotton in relation to foreign cotton is less in Japan than in the United Kingdom. The latter customarily purchases over 50% of its supplies from the United States, about 20% from Egypt, and 10% to 12% from India.¹ In Japan, however, only 40% to 45% of the imports are of American cotton, and an equivalent amount is imported from India.²

An additional threat to American cotton in foreign markets is the increasing interchangeability between short-staple American and Indian cotton, and long-staple American and Egyptian cotton. Formerly the distinction between American, Indian, and Egyptian cotton was more pronounced, and mills using American cotton could not adjust their machinery to use Indian cotton. The Indian cotton had a very short staple, ranging from $\frac{3}{8}$ to $\frac{7}{8}$ inches in length, but since about 1915, active efforts have been made to increase the length of the staple by using American upland strains. As a consequence, it was estimated that 30% of the 1933-1934 Indian crop was longer than $\frac{7}{8}$ -inch staple.³ In Egypt, the production of the low-yielding, long-staple cotton has declined, and the production of higher-yielding, shorter-staple cotton has increased. In 1922, approximately 25% of the Egyptian acreage was cotton with a staple length of $1\frac{1}{16}$ to $1\frac{3}{16}$ inches and this percentage had increased to 50% by 1932.⁴ This increase in production of shorter-staple Egyptian cotton also resulted in increased competition with American varieties.

It also became increasingly apparent during the depression of 1929-1933 that the framework of international trade had shifted, and many countries found it difficult to secure adequate foreign exchange for imports of American cotton, not only because of the business depression but also because of changes in foreign trade

¹ International Institute of Agriculture, *World Cotton Production and Trade*, p. 358.

² *Ibid.*, p. 427.

³ U. S. Department of Agriculture, Bureau of Agricultural Economics, *The World Cotton Situation, Foreign Cotton Production (Preliminary)* (Mimeographed, Washington, 1935), Section on India, p. 4.

⁴ U. S. Department of Agriculture, *World Cotton Situation, Foreign Cotton Production (Preliminary)*, Section on Egypt, p. 4.

determined in many cases by political developments. Another important factor was the stoppage of large amounts of American capital which had been sent abroad in the 1920's in the form of investments.

Exports to Germany declined substantially because of Germany's self-sufficiency policy which resulted in highly restricted imports. Germany turned to other countries, principally in South America, to secure cotton by barter agreements, the cotton being shipped in exchange for specified goods of German manufacture. Japan's financial difficulties have recently been reflected in reduced importations of cotton. In the year ending August 31, 1938, imports of raw cotton by Japan were less than half the total of the preceding year, and imports of American cotton declined from 1,558,000 bales in 1936-37 to 675,000 bales in the year ending August 31, 1938.¹

With this picture of the world-wide interrelationships of cotton production and consumption, it is possible to examine the efforts of the United States Government in controlling cotton production and the effects of this control on the international framework of cotton prices and uses.

CONTROL OF COTTON PRODUCTION AND MARKETING BY THE UNITED STATES GOVERNMENT

The influence of the United States Government through its control over cotton production and marketing first began to be felt in 1929 when the government attempted to protect the southern cotton growers from price declines. The Agricultural Marketing Act of 1929² created the Federal Farm Board, designed to assist farmers to achieve "orderly marketing" of their crops. The Federal Farm Board announced in the fall of 1929 that loans would be made on the basis of 16 cents a pound to cotton cooperative marketing associations. This declaration marked the first attempt of the United States Government to stabilize cotton prices. The current price of 17 cents a pound at that time was considered too low by the Federal Farm Board, and loans were made to the cooperatives to permit them to hold their cotton for higher prices.

¹ Japan Cotton Merchants Union (Osaka), *Monthly Report of Cotton, Cotton Yarn, and Cloth*, September, 1938, p. 5.

² Public No. 10, Seventy-first Congress, 46 Stat. 111.

In February, 1930, the price dropped below 16 cents. During the marketing of the crop, many of the cooperatives were so convinced that prices would rise they bought futures when they sold cotton. As prices declined, the cooperatives were reluctant to take their losses, and accepted delivery on their futures contracts. For this reason a temporary corner in May and July contracts existed, and a few bales were actually returned from Europe to America to meet these contracts. Many bales of better quality than the basic tenderable grade, $\frac{7}{8}$ -inch middling, were also delivered in the emergency, being the only available supply of cotton certificated for delivery on futures contracts on the New York futures market. This cotton would have brought a good premium in the spot market but it was delivered on a futures contract, at only a slight premium.

In June, 1930, the Cotton Stabilization Corporation was formed by the Federal Farm Board to take over at 16 cents a pound the cotton which the cooperatives had accumulated on maturity of their contracts. A total of 1,300,000 bales was thus transferred. The Federal Farm Board continued to make loans to cooperatives in 1930 to assist them in advancing 90% of the value of the crop to the farmers, thereby withholding an additional 2,100,000 bales from the market.

In 1931 the Farm Board agreed to extend its financial assistance until July 31, 1932, and persuaded the banks to finance the holding of an additional 3,500,000 bales for the season. There were no further agreements after this, and the pressure of the large carryover reduced the price of cotton to less than 6 cents a pound.

The first period of government control ended with large supplies of cotton bought at prices well above prices prevailing at the time of termination, and the attempt to raise prices was a complete failure, resulting in large financial losses to the government.

In 1933 the newly established Farm Credit Administration inherited the obligations of the Federal Farm Board, which was still holding approximately 1,580,000 bales as security for the government loans made in previous years. Furthermore, in May, 1933, the Farm Credit Administration assumed jurisdiction over the 788,000 bales which had been turned over to the Secretary of Agriculture as security for seed and crop production credit loans. In July this cotton was sold to the Secretary of Agriculture

for use in the Agricultural Adjustment Administration crop reduction program. Some of this cotton consisted of futures contracts calculated in terms of 500 pounds gross weight; the actual bales, however, were of varying net weight. Some of the latter, consisting of long-staple cotton that would not be used in the program, was sold. Futures contracts were purchased, and deliveries were made on some of the futures contracts held. As a consequence, the Secretary actually acquired 2,487,300 bales for use in the cotton production program.¹ All the cotton accumulated by the Federal Farm Board during its stabilization operations was not transferred, however, since more than 800,000 bales had been donated to the American Red Cross, and approximately 1,000,000 bales had been sold at prices considerably below the levels at which the loans had been made on this cotton.

The cotton was transferred to the Department of Agriculture at $9\frac{1}{2}$ cents a pound when the market price was averaging approximately 9 cents. For this cotton the Department of Agriculture itself paid a sum equivalent to 5 cents a pound, and the remainder of the funds came from appropriations made under the National Industrial Recovery Act. In other words, a part of the loss sustained by the government was transferred from one agency to another.

All these transactions were preliminary to the cotton acreage reduction program of the Agricultural Adjustment Administration. The Administration was then in the midst of a campaign to plow up one-third of the cotton crop planted in 1933. To compensate the growers, two plans were offered which were available to those who would take out of production not less than 25% and not more than 50% of their acreage. The grower had the option of selecting either plan. The first plan consisted of a cash payment on a per acre basis, varying with the estimated yield from \$7 an acre on 100- to 124-pound yields to \$20 an acre for yields of 275 pounds and more. Cash was paid to the grower for every acre plowed under. The second plan provided for a cash payment varying from \$6 per acre on 100- to 124-pound yields to \$12 an acre on lands estimated to yield 275 pounds an acre or more, and in addition the growers had the option of buying from the Secretary of Agriculture at 6 cents a pound the estimated amount of the

¹ U. S. Department of Agriculture, AAA, *Agricultural Adjustment* (Washington, Government Printing Office, 1934), p. 33.

1933 cotton crop plowed under in accordance with the agreement. This cotton was to come from the Federal Farm Board holdings purchased by the Secretary of Agriculture. Fifty-six per cent of the contracting farmers selected the latter plan of a cash payment plus the cotton option.¹

Cotton prices declined sharply in July, 1933. At the same time, the prices for other goods that the farmer was purchasing were increasing, and the benefit payments were not being made promptly. In September, after various delegations had visited Washington, the Roosevelt Administration announced that the Federal Government would lend 10 cents a pound on 1933 cotton through the agency set up for this purpose, the Commodity Credit Corporation. All borrowers, however, were required to sign the acreage reduction contract for the crop to be planted in 1934. The price of cotton was then approximately 10 cents. The loans were made with warehouse receipts as security at the rate of 4% interest. If the producer complied with the terms of the loan agreement, he was not personally liable for any deficiency between the amount realized when the cotton was sold and the amount of the loan. Again, the government came to the rescue of the cotton grower and guaranteed him a return that could not be obtained by selling his cotton in the open market.

About this time it became apparent that the crop would be much larger than had been anticipated. Very favorable growing conditions prevailed and an extremely high yield per acre was obtained, which resulted in a crop of 13,047,000 bales. It was estimated that a record crop of 17,600,000 bales would have been harvested if there had been no plow-up campaign.² This large crop did not result from any increase in the acreage, since the original acreage planted in 1933, while larger than that in 1932, was smaller than that planted in 1930 when a crop of 13,932,000 bales was harvested.

In November it was announced that those growers electing the cash and option plan could secure an advance of 4 cents a pound by having their option cotton entered in the 1933 producers' pool, which was organized by the Agricultural Adjustment Administration to prevent the dumping of 2,400,000 bales on the market.

¹ Richards, Henry I., *Cotton and the AAA* (Washington, The Brookings Institution, 1936), p. 199.

² International Institute of Agriculture, *World Cotton Production and Trade*, p. 173.

This 4-cent advance was, of course, a 10-cent loan with the producers' purchase price of 6 cents a pound deducted. The pool agreement specified that none of the pooled cotton should be sold before July 1, 1934, unless cotton prices rose above 15 cents a pound. Four-fifths of the "option" farmers selected the pool plan, hoping for higher prices, since under this plan they were entitled to a share in the profits of the pool.¹ They were required, however, to execute the cotton acreage reduction contract for the crop to be planted in 1934 in order to be eligible to include their cotton in the pool.

In April, 1934, Congress passed the Bankhead Act² and nominally changed the cotton control program from one of cooperation to one of compulsion. Before the enactment of this legislation, the Department of Agriculture had made agreements to keep 15,000,000 acres out of production during the 1934-1935 crop year. The Bankhead Act was effective for one crop year and could be extended for a second year should the President decide the emergency required it, and if two-thirds of the cotton producers voted for the extension. Under this act the crop was limited to 10,000,000 bales of 500 pounds net weight for the crop to be harvested in 1934. The method evolved for the enforcement of this legislation was a tax on all cotton produced in excess of the quota. This excess production was to be subjected to a tax of 50% of the average central market price for $\frac{7}{8}$ -inch middling spot cotton. This tax was to be not less than 5 cents a pound. Allotments of the quota were made by states, then by counties, and finally quotas were established for each individual farm on the basis of its yield record. Tax-exempt certificates were issued to each farmer, these certificates being attached to the bale of cotton after ginning. The certificates were transferable, and any farmer who harvested less than his quota could sell his exemption certificates or hold them for the following year. Since the 1934 crop totaled only 9,400,000 bales of 500 pounds net weight each, tax-exempt certificates for 600,000 bales, that had not been used during the season, were available. These certificates were valid for the 1935-1936 crop.

An individual farmer's supply of tax-exempt certificates did not always tally with the actual amount of cotton that he har-

¹ Richards, *op. cit.*, p. 205.

² Public No. 169, Seventy-third Congress, 48 Stat. 969.

vested; some of the farmers harvested cotton in excess of their quota, others had unused certificates. To facilitate purchases and sales of these certificates, the Surplus Cotton Tax Exemption Certificate Pool was established in the fall of 1934. A fixed price of 4 cents a pound was established, and when the pool was closed each producer received his proportionate share of cash for certificates sold and, in addition, his share of the unsold certificates that could be used in the 1935-1936 crop year.

In return for this restriction of production, two types of payments were made to the farmer. The first was an actual rental payment for the land taken out of production. This amount was paid to the individual farmer for the land taken out, at the rate of $3\frac{1}{2}$ cents a pound on the average yield of lint cotton per acre on such land in the years 1928-1932 inclusive. In addition, "parity payment" guaranteed to be not less than 1 cent a pound was to be paid on the "farm allotment," which was defined as the average yield of 40% of the acreage in the base period 1928-1932. This payment was to be made in December. The contracts provided that "managing-share tenants"¹ should receive half of the rental payments, and all tenants, including croppers, should share in the parity payments to the same extent as in the crop.

Loans on the crop harvested in 1934 were made by the Commodity Credit Corporation on the basis of 12 cents a pound, again with the provision that the agreement for a reduction in acreage in 1935 be signed. As a result of these and previous loans, the government held approximately 6,000,000 bales at the end of the 1934-1935 season, which made it by far the most important influence in the world cotton market.

After a questionnaire survey of the cotton growers had been made, the President declared the Bankhead Act to be continued in effect for the 1935-1936 crop.² The growers were encouraged to rent 35% of their acreage to the Secretary of Agriculture and were paid on approximately the same basis as in the previous year.

¹ A term that caused considerable confusion and that was later defined to be a tenant who "manages the operation of the farm."

² Later Congress renewed the act to cover the 1936-1937 and 1937-1938 crop years, provided two-thirds of the cotton growers approved. (Public 320, Seventy-fourth Congress, approved Aug. 24, 1935.) This was, of course, nullified when the Bankhead Act was repealed in February, 1936, following the U. S. Supreme Court decision that certain features of the Agricultural Adjustment Act were unconstitutional.

The rental payment was $3\frac{1}{2}$ cents a pound on the average yield of lint on the acreage so rented, with a maximum of \$18 an acre. One rental payment was to be made in the spring of 1935 and one in the fall of that year. As in the previous year, there was also a parity payment amounting in 1935-1936 to $1\frac{1}{4}$ cents a pound for the farm allotment. In September, 1935, the crop was estimated at approximately 11,489,000 bales of 478 pounds net weight each, but this estimate had been reduced to 10,734,000 bales by December 1. Approximately 11,600,000 bales could have been produced in this crop year free of the tax imposed by the Bankhead Act. The 1935-1936 quota under the Bankhead Act totaled 10,985,000 bales of 478 pounds net weight, and in addition 628,000 bales of 478 pounds net weight could have been produced tax free on 1934-1935 certificates that had not been used.

On August 22, 1935, it was announced that a loan of 9 cents would be made on cotton of $1\frac{3}{16}$ -inch middling or better to those signing acreage reduction agreements for the crop to be planted in 1936.¹ The growers were assured of a 12-cent return, however, since in the event that the average market price for the season did not reach 12 cents, the government agreed to reimburse the farmer by paying him the difference between the average and 12 cents. These payments were to be made only on cotton of the 1935-1936 allotments. This loan policy was apparently designed to prevent any further accumulations in government holdings and to put a premium on the early selling of the crop. There was no incentive for the grower to refrain from selling, and it was predicted that all the crop harvested in 1935 would move to the markets as soon as it was ginned.

The protests from southern senators and others, which greeted the announcement of the 9-cent loan, caused the Agricultural Adjustment Administration to issue four days later the announcement that 10 cents a pound would be loaned on $\frac{7}{8}$ -inch low middling and 9 cents on $1\frac{3}{16}$ -inch low middling and better grades of cotton. Another change was also made in that the extra payment to the farmer was to be calculated from the average price in 10 southern spot markets² for $\frac{7}{8}$ -inch middling cotton on

¹ U. S. Department of Agriculture, *Press Release* 331-36, Aug. 22, 1935.

² The same markets from which differentials were calculated, namely, Norfolk, Augusta, Savannah, Montgomery, Memphis, Little Rock, Dallas, Houston, Galveston, and New Orleans. U. S. Department of Agriculture, *Press Release* 349-36, Aug. 26, 1935.

the day the cotton was sold. The farmer was to be paid the difference between this average price and 12 cents, although this difference was limited to a maximum of 2 cents a pound. In other words, the government planned to pay a bounty to the farmers and let the world price seek its own level. As long as this price exceeded 10 cents a pound, the farmer would probably sell his cotton rather than borrow on it.¹

The objective of the Administration was achieved principally because the market price for cotton remained well above the loan rate. As a consequence, the 1935-1936 crop moved directly to market and only a small amount was used as security for loans.

In December, 1935, the Agricultural Adjustment Administration announced that the Secretary of Agriculture had approved a new four-year cotton adjustment contract. This contract covered the calendar years through 1939, although any cotton grower had the option of terminating the contract at the end of any year. For the 1936-1937 season, the producer signing the contract had the option of reducing his base acreage by not less than 30% and not more than 45%. The range in 1934-1935 was from 35% to 45%, and in 1935-1936, from 25% to 35%. Adjustment for later years was to be determined for each year by the Secretary of Agriculture at a time when expected conditions could be appraised more accurately.

Before these plans could be carried out, however, the decision of the United States Supreme Court in January, 1936, declaring the Agricultural Adjustment Act unconstitutional² necessitated a change in policy; the Bankhead Act was repealed in February. At the same time the Soil Conservation and Domestic Allotment Act³ was passed. This act was designed to persuade farmers to reduce acreage of the important crops by paying them for raising soil-building crops rather than for not raising soil-depleting crops, such as cotton. Under this plan it was hoped that a minimum of

¹ The price that the farmer received for his own cotton was not included in the calculation of the bounty to be paid. For example, a farmer who had cotton of a quality that commanded a 150- or 200-point premium above the base price would also receive a bounty payment equivalent to the difference between the average price of $\frac{7}{8}$ -inch middling and 12 cents, even though the premium received for his cotton brought the price above 12 cents a pound. On the other hand, a farmer whose cotton was graded lower than $\frac{7}{8}$ -inch middling would not receive any additional bounty to make up for this discount from the base price.

² *United States v. Butler*, 297 U. S. 1, 56 S. Ct. 312.

³ Public No. 461, Seventy-fourth Congress.

20% of the normal cotton acreage would be shifted to soil-building crops. To encourage this shift, farmers were offered payments of two types: one payment, which averaged \$10 per acre, was to be paid to farmers to compensate them for the loss suffered by not planting a cash crop; the other payment, which averaged \$1 per acre, was intended to finance improvements in the fertility of the land by planting soil-building crops and by work done on the land to prevent erosion. Farmers could qualify for either or both of these two classes of payment. It was estimated that approximately 80% of the farmers entered into this plan, and production for the year 1936-1937 was 12,407,000 bales compared with 10,638,000 bales produced in 1935-1936. Acreage harvested exceeded that of the three previous years, but was still approximately 20% below the acreage of 1931-1932 and 1932-1933. A severe drought reduced the yield in Texas and Oklahoma.

At the same time, the demand picture was changing, world consumption of all cotton for the year 1935-1936 increased 6% over the previous year, and consumption of American cotton increased 12%. The demand during this season resulted in the using up of all the free cotton in the hands of the shippers and dealers in the trade. In February, 1936, Oscar Johnston, manager of the cotton pool composed of cotton taken by farmers under the option described above,¹ began to sell this cotton to the trade; all this cotton had been sold by the end of July, 1936. In the meantime the Commodity Credit Corporation announced in April that cotton held as security for the 12-cent loans made to farmers in 1934 would be returned to the original borrowers at $\frac{1}{4}$ of a cent below the average spot price in the 10 designated spot markets, provided this price did not fall below $11\frac{1}{2}$ cents. In other words, the farmer who originally secured 12 cents as a loan on this cotton could obtain an additional $\frac{1}{4}$ of a cent a pound by selling the cotton and paying the Commodity Credit Corporation the market price less $\frac{1}{4}$ of a cent, provided the total payment to the corporation was not less than $11\frac{1}{4}$ cents a pound. When this offer expired in June, 1936, more than a million bales had been released and sold in the open market. When this plan was announced, it was expected that not more than a million bales would be released before September 1. Because of the demand, an additional offer to release cotton was made by the Commodity Credit Corporation

¹ See p. 170.

at the end of June, but the minimum price was set at $12\frac{1}{4}$ cents. An additional 300,000 bales were released to be sold in the open market under these conditions.

In February, 1937, the Commodity Credit Corporation announced that more cotton would be released during that season. Demand continued to be strong, and the crop harvested in 1936 was not adequate to supply all the market needs. The price was raised, however, and it was stipulated that no cotton would be released when the average price at the 10 markets was below $12\frac{3}{4}$ cents, or, in other words, unless the minimum return to the Commodity Credit Corporation was $12\frac{1}{2}$ cents. The releases under this plan were to end April 1, but the plan was then continued on the same terms. By the end of May, 1937, a total of 1,300,000 bales had been released.

The outlook was satisfactory, and it appeared that the government would be able to withdraw completely from the cotton market in the near future. A clap of thunder in the form of the official forecast of the cotton crop on August 9 disturbed the peaceful serenity of this situation, however, and sent everyone scurrying for cover to escape the deluge. The highest per acre yield on record and a bumper crop of 15,500,000 bales was forecast at this time, and within a few hours the commissioners of agriculture of 13 southern states were pounding on the doors of the Senate Agricultural Committee demanding loans to protect the farmer. Later in the month the Administration announced that loans would be made at 9 cents a pound, and that farmers would be paid as a subsidy the difference between 12 cents a pound and the price prevailing in the 10 spot markets on the day of sale, provided this subsidy did not exceed 3 cents a pound. This latter provision was limited to only 65% of the farmers' base production calculated on a 1928-1932 average. It was estimated, therefore, that the subsidy would be paid on approximately 10,600,000 bales.

The clouds were growing darker and another rumble was heard when the September, 1937, forecast raised the estimate of the crop to more than 16,000,000 bales. There was real consternation, indeed, when the November figures appeared, setting the crop at 17,573,000 bales, the second largest crop in the history of the country, exceeded only by the record crop of 1926. When the final ginning figures were published in March, 1938, reporting a crop of 18,934,000 bales, exceeding the 1926 crop by a million

bales, it was apparent that the government would not be free of the cotton business for a considerable period of time.

Cotton again began to move into the hands of the Commodity Credit Corporation, which still held 1,600,000 bales of cotton that had not been released. By the end of May, 1938, the Commodity Credit Corporation had made loans on 5,368,835 bales of the crop harvested in 1937, of which 161,373 bales had been released, leaving a total of 5,207,462 bales held as security. The total held by the corporation, including the 1,600,000 bales already accumulated, amounted to approximately 6,800,000 bales.

In February, the Agricultural Adjustment Act of 1938 was passed.¹ This bill has been called the most complex legislation ever passed by the Congress of the United States, principally because it delegates legislative authority to the Secretary of Agriculture in such great detail, concerning several crops and a variety of situations.

As regards the loans made on 1937 cotton, the act extended the maturity date from July 31, 1938, to July 31, 1939, although it provided that the cotton could be sold upon the request of the borrower.² In addition, a provision was included permitting the farmer who was borrowing from the Commodity Credit Corporation to transfer title to that corporation and receive a bonus of 2 cents a pound, provided he signed a compliance agreement for the 1938 season.³ The farmer could wait until July 1, 1938, to decide whether or not the market was in a state to justify this action.

Part of the complexity of the act lies in the fact that the directions as to the administration of it are phrased in such terms as "reflect the results of," "equivalent purchasing power," and "adjusted for current trends" which cannot be defined until a number of regulations and administrative rulings have been handed down indicating how the act will be administered. The specific references to cotton include provisions for loans, for a continuation of payments to farmers complying with the programs adopted under the Soil Conservation and Domestic Allotment Act provided these farmers did not plant cotton in excess of the farm acreage allotment, and for the establishment of marketing quotas when necessary.

¹ Public No. 430, Seventy-fifth Congress.

² Sec. 382.

³ Sec. 381(b).

Under the terms of the 1938 act the Commodity Credit Corporation is directed to loan to cotton farmers during any year "in which the average price on August 1 of seven-eighths middling spot cotton on the ten markets designated by the Secretary is below 52 per centum of the parity price of cotton on such date, or the August crop estimate for cotton is in excess of a normal year's domestic consumption and exports, at rates not less than 52 per centum and not more than 75 per centum of the parity price of cotton as of the beginning of the marketing year."¹

The act also provides for a national allotment of cotton to be determined by the Secretary and allotted to states, counties, and then to each individual farm. Soil conservation payments are to be made on the basis of these allotments. In addition, the Secretary is directed to institute marketing quotas; to be effective, however, two-thirds of the farmers voting on a referendum must approve. Penalties of 2 cents a pound are to be levied against any farmer who markets cotton "in excess of the farm marketing quota for the marketing year for the farm in which such cotton is produced." Marketing quotas are to be established "whenever the Secretary determines that the total supply of cotton for any marketing year exceeds by more than 7 per centum the normal supply thereof for such marketing year." The normal supply of cotton is defined as being a normal year's domestic consumption (yearly average of 10 preceding years, "adjusted for current trends") plus a normal year's exports (yearly average of 10 preceding years, again with the mystifying qualification that they be "adjusted for current trends") plus 40% as an allowance for normal carryover. For 1938 this meant that the 7% excess over normal supply would set the figure at approximately 19,500,000 bales.²

As of July 15, 1938, the parity price as calculated by the Agricultural Adjustment Administration was 15.90 cents a

¹ Sec. 302(c). In Sec. 301(a) (1) "parity" is defined as follows: "of [the] price for the commodity which will give to the commodity a purchasing power with respect to articles that farmers buy equivalent to the purchasing power of such commodity during the base period . . . [parity price shall] also reflect current interest payments per acre on farm indebtedness secured by real estate, tax payments per acre on farm real estate, and freight rates as contrasted with such interest payments, tax payments, and freight rates during the base period." The base period for cotton was August, 1909, to July, 1914.

² Normal domestic consumption of 7,000,000 bales, normal exports of 6,000,000 bales, 40% allowance for carryover or 5,200,000, and 7% of this total of 18,200,000 equals 19,500,000 bales.

pound. Since the average price in the 10 spot markets fell below 8.27 cents a pound, which was 52% of this figure, it was mandatory under the act that loans be extended to farmers. Consequently the Commodity Credit Corporation announced late in August that loans of 8.30 cents a pound would be made on middling $\frac{7}{8}$ -inch cotton, with premiums or discounts for grades above or below this grade. Only those cooperating in the crop reduction program could receive the full amount of the loans, noncooperators being eligible only for that portion of their production in excess of their marketing quotas, and then at only 60% of the rates applicable to cooperating producers. By June 15, 1939, loans had been made on 4,478,893 bales of the crop harvested in 1938 at an average of 8.85 cents a pound.¹

Until this act is repealed, amended, or changed, government activities will have a very direct bearing on prices, production, and consumption of American cotton in foreign mills. It is also likely that foreign acreage will continue to increase so long as these restrictive measures are applied to the production and marketing of American cotton. With a 6,800,000-bale "kitty" already in the hands of the Commodity Credit Corporation before the harvesting of the 1938 crop, and with additional loans made on this crop bringing the total to over 11,000,000 bales, it appears that the activities of the government to date will be commonplace by the time the program outlined in the Farm Act of 1938 either collapses or is abandoned or modified.

Some idea of the magnitude of the problem may be gained from the decline in exports. Estimates of exports of cotton for the 1938-1939 season indicated that the total would not exceed 3,500,000 bales,² the lowest figure since 1881. For the first ten months of the season, August, 1938, through May, 1939, exports totaled 3,107,000 bales as compared with a total of 5,227,000 bales exported in a comparable period of the preceding year.³

During this period, both the government and the cotton trade were at work attempting to discover some workable solution to the problem. From the government came two suggestions, the barter of cotton and the use of an export subsidy. A deal was made with Great Britain involving the exchange of 600,000 bales of cotton

¹ *Commercial & Financial Chronicle*, June 24, 1939, p. 3866.

² *The Cotton Trade Journal*, Vol. 19, No. 24, June 17, 1939, p. 1.

³ *The Wall Street Journal*, June 15, 1939, p. 3.

THE AGRICULTURAL INDUSTRIES

EXHIBIT II
SUMMARY OF GOVERNMENT ACTIVITIES AFFECTING COTTON
(For the years 1929-1938)

Year	Authority	Administrative organization	Provisions	Objectives	Results
1929	Agricultural Marketing Act	Federal Farm Board	Revolving fund of \$500,000,000 established. Loans to cooperatives authorized.	To encourage organization of cooperatives. To control surpluses through orderly marketing and distribution.	Loans made to cooperatives at 16 cents a pound on 1,300,000 bales of the 1929 crop.
1930	Agricultural Marketing Act	Cotton Stabilization Corporation		To secure better prices for farmers by financing holding of surplus.	Took over 1,300,000 bales from Federal Farm Board. Additional 2,100,000 bales acquired by advancing 90 % of value to cooperatives.
1931	Agricultural Marketing Act	Cotton Stabilization Corporation			Pledged to carry 3,100,000 bales to July 1, 1932. Persuaded banks to finance holding of additional 3,500,000 bales.
1932	Agricultural Marketing Act	Cotton Stabilization Corporation			Donation of 800,000 bales to American Red Cross. Sale of 1,000,000 bales.
1933	Agricultural Adjustment Act National Industrial Recovery Act	Agricultural Adjustment Administration Commodity Credit Corporation	Rental and benefit payments authorized. To make loans or purchase agricultural commodities designated by President.	To reduce acreage. To establish "parity" prices. To enable farmer to hold cotton and benefit from price rises.	Plow-up campaign reduced 1933 crop by 4,500,000 bales. Loans at 10 cents per pound made on 4,300,000 bales including operation cotton. Loans on 1,000,000 bales paid and cotton withdrawn.
1934	Bankhead Act	Agricultural Adjustment Administration Commodity Credit Corporation	10,000,000 bales production in 1934. Tax of 50 ¢ on cotton in excess of quota.	To force compliance on all cotton producers.	Crop for 1934 limited to 10,000,000 bales. Loans at 12 cents a pound made on 1934 crop—4,800,000 bales in loan.

EXHIBIT II (Continued)

Year	Authority	Administrative organization	Provisions	Objectives	Results
1935	Bankhead Act	Agricultural Adjustment Administration			Crop limited to 11,000,000 bales.
		Commodity Credit Corporation			Loans made at 10 cents a pound with little being held. Bounty paid to farmers to provide 12 cents a pound return.
1936	Soil Conservation and Domestic Allotment Act	Agricultural Adjustment Administration	To make payments for diversion of land to soil-building crops.	To continue Agricultural Adjustment Administration after Supreme Court decision.	Acreage reduced approximately 20 %.
		Commodity Credit Corporation			1,300,000 bales released from loans. 1,900,000 bales of option cotton sold by pool.
1937		Commodity Credit Corporation			Additional 1,300,000 bales released by end of May. Total of 1,600,000 bales still held. Loan of 9 cents a pound made on 5,200,000 bales.
1938	Agricultural Adjustment Act of 1938	Agricultural Adjustment Administration	To continue payments for soil conservation and to establish marketing quotas.		Loans authorized at 8.3 cents for 7/8-inch middling.
		Commodity Credit Corporation	To make loans when cotton prices are below 52 % of parity price.		Loans made on 4,478,893 bales of 1938-39 crop. Total cotton held, over 11,000,000 bales.
1939		Commodity Credit Corporation			Subsidy set at 1 1/2 cents a pound. Egypt abolishes export tax on cotton to offset U.S. subsidy.
	1940 Dept. of Agriculture Appropriation Act	Secretary of Agriculture	Not over \$14,000,000 to be used for export subsidy.	To stimulate cotton exports.	

for 85,000 tons of rubber from British Malaya.¹ Under the terms of the agreement, if there is no war, the stocks of these two commodities will be held for seven years.

After some difficulty, including a rejection of the plan in one vote of the House, the export subsidy scheme was passed by Congress in June, 1939.² At that time there was no agreement as to how much cotton would be subsidized, nor at what price. There was general agreement that the subsidy would not be more than 2 cents a pound. The bill limited the amount of funds for this purpose to \$14,000,000. Added to this was \$22,500,000 from customs receipts, which indicated that a maximum of 3,660,000 bales could be exported during the 1939-40 season with a subsidy of 2 cents a pound.³

In 1938 the cotton trade organized in the National Cotton Council, and in 1939 aggressive efforts were being made on several fronts to increase consumer demand for cotton. This Council included representatives of cotton producers, cotton ginner, cotton merchants, cotton warehousemen, and cottonseed crushers. The purpose of this group was to coordinate the interests of all the representatives of the cotton trade and to formulate programs which would result in some progress in solving the problems of the cotton world.

A summary of government activities affecting cotton is presented in Exhibit 11. From a business standpoint, these activities would probably be considered an unwise venture in which millions of dollars have been lost, growing crops have been destroyed, bounties have been paid, production has been restricted, exports have declined, and the statistical position of cotton has been made worse than when the activities were begun. The cotton trade during one period was entirely dependent upon the government for supplies of cotton, and the government is still faced with the problem at some future time of disposing of approximately 11,000,000 bales of cotton. The arguments presented for the other side are that prices were higher and farmers secured a larger return because of government operations, and, while the present situation is not a happy one, it would have been disastrous to all concerned if the government had not taken some action.

¹ *The New York Times*, June 24, 1939, p. 1.

² *The Cotton Trade Journal*, Vol. 19, No. 25, June 24, 1939, p. 1.

³ Later it was officially announced that the subsidy would be paid at the rate of 1½ cents a pound on cotton sold for export from July 27, 1939, to June 30, 1940. *The New York Times*, July 23, 1939, Section 1, p. 1.

It seems clear, however, that the artificially high prices of American cotton encouraged increased consumption of foreign cottons. While these actions of the government were not the only cause of increased production and consumption of foreign grown cotton, they were the most important. The actions of the government have also had an adverse effect on many concerns in the cotton trade. Increased prices through artificial means have undoubtedly affected demand and tended to reduce somewhat the consumption of cotton to a point below that which would have been secured at a lower price level. Shippers and mills are both affected adversely when the volume of operations is reduced.

The problem can be summed up as follows: American cotton competes in world markets with cotton produced elsewhere, and any attempt to raise the price of American cotton through control of production, fixed prices, or other monopolistic actions serves to place American cotton at a competitive disadvantage in regard to price, and cotton is bought largely on the basis of price. Almost half the cotton grown in the United States is exported and is affected by such governmental actions. No government program can be successful if it ignores these facts and initiates policies detrimental to American cotton in world markets.

COTTON MANUFACTURING

The hope for large and quick profits attracted great quantities of capital into the American cotton-textile manufacturing industry during the past century, and the industry has reached first rank from the standpoint of the volume of textile goods produced, consuming considerably more cotton than any other country and being exceeded only by the United Kingdom in number of spindles.¹ The industry has long been the principal consumer of American cotton, only a small amount of foreign cotton being imported. In addition, the cotton-textile manufacturing industry employs more wage earners than any other industry in this country. It has been profitable during much of the time since its establishment a century and a half ago. In the 1920's, however, there were indications that the industry was not maintaining its success of the preceding century.

In 1790, cotton manufacturing began in this country when Samuel Slater, a young skilled mechanic who had left England

¹ International Institute of Agriculture, *World Cotton Production and Trade*, pp. 343-345.

secretly because of the English laws that prohibited the exportation of machinery and emigration of skilled mechanics, constructed from memory the hand-driven machines required to operate the first successful cotton mill in the United States. This mill began its operations in Pawtucket, Rhode Island, in the fall of the same year. In 1814, Francis Lowell, of Boston, invented and operated successfully the first power loom used in the American cotton-textile industry, starting an enterprise that was to become of major importance in the life of New England. The growth of the young industry was stimulated by embargoes which prevented the importation of foreign cloth, and financial support was provided from wealth accumulated in the China and India trade. From these humble beginnings cotton manufacturing expanded rapidly, first in New England and then in the South, until the third decade of the present century.

For about a hundred years cotton-textile manufacturing was one of the most profitable and important industries in New England. During the last 30 years, however, the New England states have lost their predominant position in this industry; and during the last 15 years the cotton-textile mills of New England have ceased to be profitable as a whole. Many of them have been liquidated. The number of New England fortunes derived from the cotton-textile industry gives some indication of its profitability. Dividends were paid in amounts varying with the amount of cash in the companies' treasuries. A clue to the profits of the industry, therefore, is the record of dividends paid, but these figures are given in percentages of the stated capitalization and are not strictly accurate, since the stated capitalization did not necessarily represent the capital actually invested in the properties. Profits, even though they were not always accurately computed, were reinvested in the plant, and, when improvements were not needed, the value of the plant was often written down or the profit was transferred to surplus. There are several instances of mills having surpluses which, in the 1890's and early 1900's, exceeded the amount of the capital stock.¹

A few citations of the dividends paid in the early years of the industry will show why capital flowed so freely into this industry. The Merrimack Manufacturing Company paid a dividend of

¹ Copeland, Melvin T., *The Cotton Manufacturing Industry of the United States* (Cambridge, Harvard University Press, 1917), pp. 395, 397.

\$100 a share in 1825, a year and a half after its mills began operation.¹ From this time until 1858 the dividend disbursements averaged 12% annually.² From 1837 to 1876 the Amoskeag Manufacturing Company paid in dividends an average of 11% a year.³ Professor Melvin T. Copeland of the Harvard Business School has computed the average ratio of dividends to capitalization of 76 mills from 1889 to 1908, and discovered that these payments averaged 7.7% annually.⁴ Some of the individual mills for which he secured figures averaged 25% and 30% annually for the full period of 20 years. It was a rule of thumb among investors, up to 1900, that in order to compensate for the risk, a cotton mill should earn 15% a year and that about half the profits should be paid in dividends.

The cotton-textile industry in the South was born much later than in the North. While a few scattered mills were in operation before 1880, there had been no concerted movement to establish mills in this section until that time. The Atlanta Cotton Exposition of 1881 stimulated interest in the industry and cotton mills began to spring up in the South overnight. The South seized this opportunity to rehabilitate itself and establish an industrial regime which, it was hoped, would rival that of the North. As soon as operations were begun, profits were made by many of the mills. In the South Carolina mills, in the 1880-1890 decade, profits ranged from 18% to 25½%.⁵ Competition from these southern mills was felt by the northern industry during the depression of the 1890's, but between 1900 and 1910 the northern mills strengthened their position by installing new machinery and economizing on selling costs, and were affected no more adversely in the next slump than were the southern mills.⁶ The spindlage of southern mills increased at a rapid rate in this first decade of the new century, but it has been estimated that they were earning no more than their northern competitors at the time.⁷ The data in Exhibit 12 indicate the growth of the industry in the South.

¹ Appleton, Nathan, *Introduction of the Power Loom and Origin of Lowell* (Lowell, B. H. Penhallow, 1858), p. 25.

² *Ibid.*, p. 25.

³ Browne, George W., *The Amoskeag Manufacturing Company: A History* (Manchester, Amoskeag Manufacturing Co., 1915), p. 201.

⁴ Copeland, *op. cit.*, pp. 263-265.

⁵ Mitchell, Broadus, *Rise of the Cotton Mills in the South* (Baltimore, Johns Hopkins Press, 1921), p. 265.

⁶ Copeland, *op. cit.*, p. 52.

⁷ Mitchell, *op. cit.*, p. 266.

EXHIBIT 12

NUMBER OF ACTIVE COTTON SPINDLES IN COTTON-GROWING AND NEW ENGLAND STATES,* 1880-1938

Year	Cotton-growing states†	New England states
1880	561,360‡	8,632,087
1890	1,570,288	10,934,297
1900	4,367,688	13,171,377
1905	7,631,331	14,202,971
1910	10,494,112	15,735,086
1915	12,955,712	17,100,615
1920	15,230,983	18,287,424
1925	17,292,042	15,975,442
1930	18,585,878	11,351,290
1935	18,211,994	7,763,038
1936	17,834,378	6,091,604
1937	18,243,820	6,424,530
1938	18,128,112	5,918,686

* Prior to 1915 figures as of August 31; 1915 and subsequent years as of July 31.

† States usually classified as "cotton-growing states" are as follows: Alabama, Arkansas, California, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

‡ Cotton mills only.

Source: U. S. Bureau of the Census, *Cotton Production and Distribution*, Bulletin No. 175 Washington, Government Printing Office, 1938), p. 27.

The Lawrence, Massachusetts, textile strike in 1912 and the legislation restricting hours of operation that followed it constituted a serious handicap to the industry in Massachusetts and probably marked the beginning of the change in leadership from the North to the South. But the actual shift in the geographical center of the industry was delayed by the activity in both sections during the period of the World War. Any mills in operation during this period could make money, and practically all the mills were swamped with orders. This abnormal condition resulted in a continuation of the trend of plant expansion and establishment of new mills, but after 1919, when the war demand disappeared, the industry was left with excess capacity.

Although the industry in the North had felt the effects of southern competition for some time, in 1920, for the first time in the history of the industry, the effect of the collapse was more severe in New England than in the South. There were two principal reasons for this: (1) in 1921, southern wages were severely cut with the workers acquiescing, while in the North the effort of the mills to reduce wages resulted in a long strike, in 1922, which the strikers won; (2) in Massachusetts, hours of labor were limited by a new law to 48 hours a week, and night work (after

6 p.m.) by women was prohibited, while in the South mills operated from 55 to 60 hours a week with little or no limitation on night work. It seems likely that if the New England mills had been able to reduce wages in 1921 and increase working hours to 55 per week, the workers could have earned a living wage and the mills could have met the competition of the South. But under the conditions that did exist many of the New England mills suffered severely because of the comparatively higher costs of operation. Some northern mills were dismantled and the machinery transported to the South. It has been estimated that during the period 1923-1930 at least half of the net increase in southern spindles resulted from the installation of secondhand spindles brought from New England.¹ The competition continued to be increasingly severe, and at the low point of the recent depression, in 1932, the New England textile industry was on the verge of collapse. The undermining of the northern mills went on for a long time before abandonment of plants began, for cotton consumption in New England mills had been declining steadily since 1923.

At first, the North felt the competition of the South most severely in the coarser grades of cloth, since the relatively unskilled labor of the South could be used most efficiently in the manufacture of these goods. As a result, the northern mills tended to concentrate more and more on the finer counts.²

One of the many arguments advanced as an inducement for the establishment of mills in the South was the proximity of these mills to the raw material and the consequent saving that could be effected in transportation charges. There was the added expense, however, of shipping the fabricated material to northern markets. In some places, furthermore, cotton could be obtained locally without compress charges, and occasionally at a fraction of a cent lower than the prevailing market price. The mills in the South were not located, however, so that all the cotton required could be secured from adjacent territory or even from within the same state. Exhibit 13 shows the change in number of spindles since 1914 in the 25 largest counties with respect to number of spindles

¹ Murchison, Claudius T., "Southern Textile Manufacturing," *The Annals of the American Academy of Political and Social Science*, January, 1931, Vol. 153, p. 31.

² The count of cotton yarn is determined by the number of 840-yard hanks necessary to weigh one pound. Thus, a yarn of a size requiring 40 hanks to weigh a pound would be called 40's. The finer the thread, the higher the count.

in place. It should be noted that the concentration of spindles in the South does not coincide with the concentration of cotton production.

EXHIBIT 13
COTTON SPINDLES IN PLACE IN 25 COUNTIES OF GREATEST
CONCENTRATION: 1914, 1933, AND 1937

Cotton-growing States			
County	1914	1933	1937
Gaston, N. C.....	507,192	1,168,858	1,163,098
Spartanburg, S. C.....	807,436	993,090	1,001,332
Anderson, S. C.....	574,784	656,756	694,482
Greenville, S. C.....	742,690	751,732	655,092
Pittsylvania, Va.....	297,048	468,608	484,552
Muscogee, Ga.....	269,684	438,806	456,244
Cabarrus, N. C.....	281,532	444,304	454,256
Union, S. C.....	313,952	347,100	347,276
Guilford, N. C.....	213,868	315,072	333,500
York, S. C.....	182,224	263,744	305,920
Madison, Ala.....	211,902	308,856	300,384
Greenwood, S. C.....	206,130	284,120	288,392
Pickens, S. C.....	207,528	274,136	268,608
Richmond, N. C.....	127,047	272,088	255,168
Laurens, S. C.....	185,184	288,016	243,388
New England States			
County	1914	1933	1937
Bristol, Mass.....	7,145,232	4,264,132	2,552,424
Providence, R. I.....	1,614,400	1,295,368	691,916
Hillsboro, N. H.....	898,944	839,956	456,570
Berkshire, Mass.....	490,008	443,976	388,004
New London, Ct.....	498,204	398,204	320,572
Windham, Ct.....	755,898	541,684	318,708
Middlesex, Mass.....	1,119,780	283,804	287,892
Androscoggin, Me.....	399,096	376,412	276,996
York, Me.....	408,600	290,132	221,056
Kent, R. I.....	694,974	307,256	160,240

Source: U. S. Bureau of the Census, *Cotton Production and Distribution*, Bulletins No. 128, p. 13; No. 170, p. 15; and No. 174, p. 25.

Some southern communities offered additional inducements to cotton mills by exempting them from taxes for a period of years. This reduction in costs was usually temporary and was not reflected to any large extent in the price of the finished product. Lower taxes in the South became more important as tax rates in New England increased.

One of the reasons frequently given for the success of southern mills is that management is superior in the South. It is obviously impossible to secure any statistical measurement of management efficiency. At best it is a matter of opinion. It appears, however, that managerial control was not so important as other factors in the decay of the industry in the North. There were examples in the South of profitable mills and unprofitable mills, and there continued to be mills in the North making profits as regularly as many other business enterprises. It is also noteworthy that there were instances in which northern management was transported to the South and made profits after having operated mills at a deficit in the North.

Power rates in the South were lower than the prevailing rates in the northern textile centers. This item in the cost of production was far too small, however, to have warranted such an industrial migration as actually took place. The percentage of power cost to total cost of a finished piece of cotton goods is very small and makes no substantial difference in the cost of production.

The South had a distinct advantage, however, in that most of the new mills installed modern and efficient equipment so as to begin operations with the very best automatic high-speed machinery. Some of the mills, however, especially those established in the South in a later period, used equipment that had been transported from dismantled northern mills.

The labor situation in the South was entirely different from that in the North and provided a distinct competitive advantage to the southern mills, since these mills were able to secure an adequate supply of comparatively high-grade labor at a low cost. The mill hands were drawn from the farming population, predominantly white, who for generations had earned starvation wages by farming poor land on which the whole family worked. Cash to them was a rare sight. They farmed their crops on credit from the country store, settling by barter at some stated date each year. To these men and to their wives and children, the new mills offered, along with the advantages of village life, an improved standard of living with much less financial worry than was involved in farming. This supply of native-born labor taken from the farms came from a different stock from that of the immigrant labor that has dominated in New England since the latter part of the last century. Not only were there no unions

in the South, but the temperament of the southern worker was unsuited to union organization. Many communities advertised the availability of a supply of labor that was easy-going, easily controlled, reasonably intelligent, and accustomed to work long hours for low wages. The differentials in wages between the North and the South constituted a serious obstacle for the northern mills to overcome in the early years, the wage rates in the South being only two-thirds of the New England rates. Since labor costs approximated 15% to 40% of total costs, the lower wage level was a distinct advantage to the southern mills. During recent years, however, this differential has lessened.¹

The southern states were also more backward in legislation restricting hours of labor. Laws in the northern states restricted the working hours of women to one daylight shift, and in Massachusetts and New York women were not permitted to work after 6:00 p.m. Such laws made it difficult and expensive for the Massachusetts mills to operate more than one shift, because many of the operations were always performed by women who commonly exceeded the men operatives in number.

The absence of such laws in the South was of particular importance after the World War. During the wartime period mills had so many orders that equipment was operated 24 hours a day. The southern mills continued to operate on a double shift after the War, although the northern mills were normally on a one-shift basis. The question of the amount of savings that can be effected by operating a double or triple shift is debatable, but overhead costs are important in the cotton-textile industry. In 1933 overhead costs were 31% of the total costs of producing print cloth in the grey, and in 1934, after the price of cotton had risen, the processing tax had been added, and wage rates had increased, overhead costs amounted to 20% of the total. Excluding the costs of cotton, overhead amounted to 57% of total costs in 1933, and 44% in 1934.²

As pointed out previously, a decline in demand for cotton cloth for clothing coincided with a sharp price decline after 1920 in both cotton and cotton goods. As a consequence, competition was bitter and principally on a price basis. With the double

¹ U. S. Cabinet Committee, *Cotton Textile Industry*, Senate Document No. 126, Seventy-fourth Congress, First Session (Washington, Government Printing Office, 1935).

² U. S. Cabinet Committee, *op. cit.*, p. 110.

shift of 55 hours a week each and lower labor costs, the southern mills had the advantage and increased their share in the decreasing market.

In the 1920's, also, the productive capacity of the industry was greatly increased by the installation of new and faster automatic machinery. Although there have been no fundamental changes in the manufacturing process in recent years, the speed of operation of the machines has been increased, and many have been made almost completely automatic in operation. In addition, the introduction of long-draft spinning and roving has reduced the number of processes. It has been estimated that man-hour output of various types of cloth increased from 46% to 90% between 1910 and 1936.¹

PROCESSING OF COTTON

Briefly described, the process performed in cotton-textile manufacturing is to spin the fibers of the raw cotton into yarn and then to weave the yarn into cloth. The three basic operations are called carding, spinning, and weaving. The raw cotton is first cleaned. In the carding process, the fibers are pulled into a rough parallel by passing them over a cylinder with hundreds of wire points. The fibers then go through a drawing process to obtain greater uniformity and eliminate kinks. The cotton for very fine yarns is also combed to straighten the fibers. After this operation the yarn is given a slight twist by a process called roving. The yarn is then ready for spinning, which draws it out into longer and finer strands and twists it into compact yarn. In the weaving process, the yarn or threads used as filling are woven into the warp threads, thus producing the cloth.

The typical cotton-textile mill is divided into five departments: carding, spinning, spooling and warping, weaving, and cloth. Spooling and warping consist of winding the cotton yarn on bobbins and then rewinding the yarn that is to be used as warp thread on large spools. After the cloth is woven, it passes through a shearing machine which clips off the loose threads. It is then ready for inspection and packaging, which are the principal functions of the cloth department.

¹ U. S. Works Progress Administration, *Studies in Changing Labor Productivity*, Report No. B-2, *Mechanical Changes in the Cotton-Textile Industry, 1910 to 1936*, by Boris Stern (Philadelphia, October, 1937), Table 1, p. 4.

The cloth comes from the looms that perform the weaving process in the form of "grey goods," and it is then ready to be finished. Finishing consists of bleaching, dyeing, and printing, and this process is frequently performed by an entirely separate company, although some of the larger textile manufacturing mills also operate finishing plants.

The sale of standardized, unbranded grey goods to other processors creates one of the most important problems in the industry. Because the goods are standardized, the principal selling appeal is that of price. This price competition creates an unstable price structure. The problem is further complicated by the fact that many mills, particularly the small ones, produce only yarns, which are sold to other mills producing knitwear, upholstery, or woven goods. The net result is that the cotton cloth is often processed by several different companies before reaching the consumer, there is no direct responsibility for the quality of goods produced, and the consumer has no means of telling what manufacturers have processed the product. There are some exceptions, a few of the large companies selling products to the consumer under their own brand names. Included in this group are such vertically integrated companies as the Pepperell Manufacturing Company, the Cannon Mills Company, the Nashua Manufacturing Company, and Pacific Mills. Kendall Mills and the Riverside and Dan River Cotton Mills, Inc., sell a smaller proportion of their production under their own brand names.

There are approximately 1,000 companies in the industry operating spinning mills. Of these, 688 have an average of 200 employees and a maximum of 30,000 spindles.¹ Slashing, which consists of strengthening and smoothing the warp threads by passing them through a succession of starches and softeners, is the largest-scale operation in a cotton mill producing woven goods, and this operation does not require the output of more than 10,000 spindles to be economical.² A total of 280 companies of the 688 mentioned above have 10,000 spindles or fewer. These

¹ The Cotton Textile Industry Committee and The Cotton-Textile Institute, Inc., *In the Matter of Survey of the Cotton Textile Industry Problems by the Committee of Cabinet Members Appointed by the President of the United States* (New York, 1935), p. 4.

² Kennedy, Stephen J., *Profits and Losses in Textiles* (New York, Harper & Brothers, 1936), pp. 185-186.

companies are principally yarn manufacturers and do not weave cotton fabrics.

MARKETING OF COTTON TEXTILES

To handle the products of these mills, a marketing framework of brokers, converters, and selling agents has become established. The brokers operate on commission, selling cloth or yarn for mills or securing supplies for purchasers. Their responsibility to clients is confined to the specific transaction, although naturally these transactions are repeated continuously for certain customers. Converters make their own contacts with the wholesale and cutting-up (garment manufacturing) trade and buy goods for finishing to their own specifications by independent finishing companies. The converters are the merchandisers of the industry. They determine the demands of consumers and transmit consumer demand to the mills through the prices they bid for various types of grey goods. On occasions, converters have commissioned mills to produce certain products and have financed the purchase of the necessary machinery. The relationship between selling agent and mill is more permanent, since the former usually handles all the sales of the mill for which he is agent. The agent does not confine his activities to a single mill or group of mills, however, but usually has a number of clients from whom he receives a commission based on the volume of goods sold. The number of mills whose products one agent may handle ranges from 5 to 40, and the commission charged is from 2% to 5%.¹ The selling agent is in much closer touch with the market than the mill and frequently dictates the type of production, particularly if financial assistance has been previously extended to the mill. Some of these selling agents, such as J. & P. Stevens, sell solely to converters, whereas others, such as Wellington, Sears & Company sell direct to industrial users and others.

The use of the selling agent, an agency outside the company performing a business function closely associated with the other business activities of a company, dates back to the beginnings of the industry in this country.² The Boston Manufacturing Company of Waltham, Massachusetts, the first concern to use power-driven looms and to combine this operation with power-driven

¹ U. S. Cabinet Committee, *op. cit.*, p. 119.

² Copeland, *op. cit.*, pp. 194-197.

spinning in the same plant, inaugurated the use of an independent agency to sell its products. Selling agents furnished the new mills with capital and permitted the early manufacturers to spend their time on production problems. The use of the selling agents continued, partly because of tradition, and also because of the financial assistance extended to the mill, the small expense of agency selling as contrasted with company selling, and the wider knowledge that these agents possessed of the marketing problems of the industry.

The financial support of the selling agent has been of great importance to many mills. These agents have endorsed notes of the mills, made loans on inventories, and mills have hypothecated accounts receivable to them. Because of their financial support, many selling agents have assumed a degree of responsibility for the operations of companies that has in effect made the mill merely a branch plant of the selling agent. Because of the selling agents' principal interest in volume of sales, however, mills have often been encouraged to increase production when restricted operations would have been wiser.¹

For the larger mills, the factor has extended considerable financial assistance.² The factor performs no selling function except of an advisory nature, but extends financial assistance by discounting sales, eliminating credit risks by assuming any losses, and making advances on merchandise. For these services he receives a commission of from 1% to 3% on total sales volume plus 6% interest on advances. This commission is the principal compensation of the factor.³

INVENTORY PROBLEMS

The selling agent is responsible for the marketing of the product, but the mill must solve its own problems of inventory control. This task is a difficult one for several reasons: (1) the dissociation between production and selling responsibility; (2) the prevalence of hand-to-mouth buying on the part of converters, which requires

¹ Copeland, Melvin T., and Learned, Edmund P., *Merchandising of Cotton Textiles—Methods and Organization* (Harvard Business School, Division of Research, Business Research Studies, No. 1, 1933), pp. 4-5.

² This factor should not be confused with the factor handling raw cotton, although the term arises in both cases because of financial assistance which they extend.

³ See Jones, Owen T., "Factoring," *Harvard Business Review*, Vol. 14, No. 2, Winter, 1936, pp. 186-199.

that large inventories be kept on hand to meet rush orders¹; and (3) the frequency of style changes and seasonal demands. When so much production of the cotton yarn and weaving mills is of standardized quality and specifications, it might appear that manufacture for stock would be an accepted practice. The price competition makes this a dangerous practice, however, since it is clear that large buyers defer orders when stocks are increasing and prices are falling.² Since such conditions reduce the value of inventories already held, a downward spiral is begun. The Cotton-Textile Institute, the trade association of the industry, collected statistics on inventories, unfilled orders, and billings; but later discontinued the publication of the data. Apparently the principal reason for discontinuing publication of these inventory figures was that converters and other buyers used the information to greater advantage than did the mills and selling agents.³ The inclination of mill owners to continue operations to cover fixed costs also aggravates the problem of inventory control.

Another problem related to inventory control is the purchase of raw cotton and the protection against price declines while the goods are in process or in finished inventory awaiting sale. While in broader swings the price of cotton goods follows the price of raw cotton, there apparently is not a sufficiently direct relationship to permit the mill substantially to reduce its risks of price change by hedging.⁴ As a consequence, the success of many mills is dependent in large part on the perspicacity of the mill treasurer in determining when to buy cotton. The mill is obviously interested in the price level of cotton, whereas the cotton shipper is, as previously noted, interested in the basis.⁵ As a consequence, many mills buy cotton "on call" and fix the price either when an order is received for yarn or cloth, or when the futures quotation

¹ This is a development since the tremendous decline of cotton and cotton goods prices, with resulting losses to the trade, in 1920. The importance of this system of purchasing is discussed in the Harvard Business School, Bureau of Business Research, Bulletin No. 56, *Distribution of Textiles*, pp. 19-21.

² Madigan, John J., *Managing Cloth Inventories in the Cotton Textile Industry* (Harvard Business School, Division of Research, Business Research Studies, No. 6, 1934), pp. 8-9.

³ Learned, Edmund P., "The Cotton Textile Situation," *Harvard Business Review*, Vol. 14, No. 1, Autumn, 1935, p. 44.

⁴ In a study of one mill from 1921 to 1926 it appeared that this mill would not have benefited by hedging all its purchases of raw cotton. Harvard Business School Bureau of Business Research, Bulletin No. 70, *A Study of Cotton Hedging for a Grey Goods Mill, 1921-26* (Boston, 1928).

⁵ See pp. 155, 156.

on which the price is based is low enough to be attractive. When the mill fixes the price, the shipper merely purchases the futures contract that he had sold at the time he purchased the cotton in the country markets.¹

The relation between inventory and style changes is important to the mill operator, but unfortunately for him the existing system of marketing usually prevents him from having any satisfactory knowledge of market conditions. Converters are responsible for new patterns and style changes, and each season they introduce new samples, some of which are successful. The converter then attempts to estimate the season's requirement from the acceptance evidenced by the buyers of the various samples. These decisions are obviously made on scanty and unsatisfactory information, and sometimes result in losses to converters. As a consequence, orders are held up as long as possible, and if demand develops, cloth is purchased from many mills immediately. Since style changes affect at least one-half the total output of cotton cloth,² this problem is widespread throughout the industry.

CAPACITY OF THE INDUSTRY

The merchandising organization, the inventory problems, the policy of purchasing raw cotton, and the effects of style and fashion changes all have a bearing on the problem of overcapacity of the industry, which results from operating policy rather than from actual excess equipment. The generally implied assumption that there is overcapacity is based on current operating policies of two or three shifts, particularly in the South. If all the industry operated 40 hours a week on a one-shift basis, production could not keep pace with demand. Remedies suggested for the problem of overcapacity have included the elimination of inefficient plants by competition, limitation of hours of operation, government subsidy for leasing of surplus machinery, government purchase of obsolete spindles, and complete control of the industry through quotas and production allotments established by Federal control in cooperation with representatives of the industry.³ Professors Copeland and Learned have expressed the opinion that the prob-

¹ The time when the price is fixed is a matter of indifference to the shipper, since the basis, or spread, has been fixed previously. The level of prices makes no difference to the shipper since he has hedged to protect himself from this price risk.

² U. S. Cabinet Committee, *op. cit.*, p. 122.

³ *Ibid.*, pp. 4-9.

lem of overcapacity was overemphasized and that the real solution lay in eliminating the selling agent, combining production, merchandising, and selling under one management for each unit in the industry, and increasing demand for the products of the mills through a better understanding of consumers' wants.¹

The extent of overcapacity of the industry is indicated by calculations in the Cabinet Committee Report, which were computed on a "commercially possible basis."² This percentage of operations to capacity varied from 29.2% in July, 1932 (before the NRA code), to the peak of 66.2% in July, 1933, when activity in the industry was tremendous in anticipation of the processing tax to be applied the following month.³ In July, 1934, the percentage of operations to capacity had dropped to 49.6%.

The urge for mills to operate to cover fixed costs has been mentioned above. This tendency is particularly noticeable in the South where there are many mill-owned houses for employees upon which taxes must be paid, where some form of relief must be extended during layoffs, and where rents are not paid by employees out of work. The costs of shutting down and reopening the plant also encourage the continued operation of the mill even at a loss. There is also the hope on the part of the mill owner that by cutting prices and continuing to operate, he will secure a larger proportionate share of the declining market. The uses for cotton cloth are many and varied, and there is always the hope that the demand from some other quarter will not have diminished and that business may be secured by price concessions. The lack of adequate information as to market demands also makes it difficult for the mill operator to know how much to produce. As pointed out above, the estimate of the selling agent who secures a commission on volume is likely to be on the high side. When overcapacity exists to such a degree in the industry and when there are such strong reasons to continue operations, the effect on prices and profits is usually unfortunate to all concerned.

The industry has long attempted to work out a satisfactory solution to the problem of overcapacity. Under the aegis of the

¹ Copeland and Learned, *op. cit.*, pp. 4-6.

² U. S. Cabinet Committee, *op. cit.*, Table 50, p. 112.

³ The basis used for this estimate was, before the NRA code for the industry was devised, 72 hours of operation per week in New England mills, and 110 hours per week in the South. The code established 80 hours per week in both sections during the time it was in effect.

Cotton-Textile Institute¹ the textile code was the first approved under the National Industrial Recovery Act. This code was hailed as the solution to the problems of the industry, for the wage differentials between North and South were reduced, and hours of operation were specified. Difficulties followed, however, and there were some violations of the code in the South, where some mills persisted in running three shifts. As a consequence, the price situation was not improved. Processing taxes proved to be a burden by increasing retail prices. Provisions of the National Industrial Recovery Act also encouraged greater organization of workers, and in September, 1934, a strike paralyzed the industry for a month. When the National Industrial Recovery Act was declared unconstitutional, the Cotton-Textile Institute attempted to secure voluntary cooperation from all members of the industry to carry out the provisions of the code with regard to a maximum of 40 hours for a work week. Except for the increase in the number of mills operating three shifts, which was not a technical violation of the voluntary agreement, these attempts to secure cooperation were moderately successful.

INTEGRATION AND MERGERS

One solution to the industry's problems, advanced by both financiers and students of the industry, is the merger of mills and the integration of processes. There are examples of both vertical and horizontal integration in the industry, some of which are successful and some not. The Cannon Mills, selling towels under its own brand name, and the Pepperell Manufacturing Company, selling sheetings to the consumer under its own brand name, are examples of successful vertical integration. The Calloway Mills of LaGrange, Georgia, is another example of mills selling direct, although these mills sell heavy cotton goods, such as hose and belting duck, to the industrial trade. Another specialized type of product, surgical gauze, is sold directly through Bauer & Black, a subsidiary of the Kendall Company, which owns mills in both the North and South. These four companies developed integrated organizations by growth and expansion. Textiles, Inc., a hori-

¹ In addition to its efforts to assist the industry through limitation of hours of operations, the Cotton-Textile Institute collects operating data for all mills, has a New Uses Department to develop new demands for cotton products, and operates a Style and News Department to aid the industry as a whole to sell cotton goods on a style basis, and to stimulate the use of cotton for clothing.

zontal merger of several yarn mills in Gastonia, North Carolina, has encountered financial difficulties. The Berkshire Fine Spinning Associates, a horizontal integration of a group of New England mills manufacturing fine goods, is an example of a more successful merger of concerns already established and operating.

In a study of the 43 mergers or consolidations of cotton mills since 1918, it was discovered that 63% were horizontal and 37% were vertical integrations.¹ Thirteen of these integrated companies later underwent financial reorganization, 12 of them having resorted to public issues of securities to finance the consolidation.²

It appears that merger as a panacea cannot be accepted, but that there are many divisions of the industry which, if integrated, would be profitable to all concerned. A merger, however, requiring any fixed charges in the form of interest or other regular payments would not be sound in light of the unsettled conditions in the industry. The New England textile industry was built up on a common stock capitalization in recognition of the fact that profits were too volatile to cover fixed capital charges safely. Likewise, a merger solely to monopolize a share of the market or control production of a particular type of goods would be fatal because of the operating flexibility of mills that would jump into the production of these goods at the slightest indication of a relative increase in price. In view of the typical transfer of selling operations of the industry to outside parties, an attempt to transfer this business function to its proper place as part of the operations of a particular mill should prove to be successful. Such a move would place the industry on a sounder business basis, and, it is likely, would result in a reduction in the number of companies. Such a reduction might presage more satisfactory results from voluntary restrictions of hours of operation in the future.

APPRAISAL OF PROBLEMS

Both the cotton farmer and the cotton mill owner are confronted by a variety of problems. Some of these problems are localized, others are world-wide in scope. The interests of both the farmer and the mill owner are in the ultimate consumption of cotton and cotton goods, but their interests diverge at several points.

¹ Kennedy, *op. cit.*, p. 119.

² *Ibid.*, p. 120.

The American cotton farmer has seen the production of cotton in other countries increase at a steady pace. It is axiomatic in cotton production that land once utilized to produce cotton will continue to be used for this purpose, principally because cotton will bring in cash in large or small amounts. American cotton producers can expect a smaller share of the world markets in the future, barring unforeseen contingencies such as wars, pests, or other restraining influences on the production of cotton in foreign countries. The increasing development of nationalism, economic isolation, and resulting monetary difficulties indicate that foreign cotton is likely to be preferred to American cotton in many cases. The strain of financing its military operations in China has already forced Japan to reduce drastically its imports of cotton. The reciprocal trade agreement with Great Britain did not affect cotton since cotton entered Great Britain duty free before the agreement. It seems unlikely, therefore, that there will be any increase in cotton exports to these two largest consumers of American cotton. Furthermore, the continuation of the government's policy in making loans to cotton growers at a rate above the world market price will make it even more difficult to sell American cotton abroad.

The control of cotton production and the extension of loans on cotton by the United States Government undoubtedly had some effect on the increase of foreign acreage, although the movement had begun some years before the government attempted to raise cotton prices. The American price-raising schemes undoubtedly accelerated the increase in foreign acreage, but the preference of foreign spinners for foreign-grown cotton, because of the price differentials resulting from the United States Government's actions, was an even more important influence. The government should not be condemned alone, since much responsibility can be attached to lack of foresight on the part of farmers and their representatives. On several occasions the application of pressure from responsible groups in the South, often representing the growers themselves, resulted in more benevolent actions on the part of the government than had been originally planned. The farmers and their representatives wanted action taken to raise prices of American cotton, and the end was achieved, but world prices remained the same, and consumption of American cotton suffered because of the price differentials.

These demands were made on the plea that the South had suffered because industries protected by tariffs sold to southern farmers at higher prices, whereas southern farmers had to sell their product in an unprotected world market. On the other hand, it can be said that such protected industries employ American laborers who are paid wages which enable them to consume more cotton goods and to buy other products to support other American industries. This argument is too complicated and interrelated, however, to admit of a readily demonstrable answer. It appears that the American farmers have learned what businessmen learned in the 1880's, that sufficiently vociferous and influential pressure groups can secure government protection and aid. Business had its turn and suffered for some of its greediness; now the farmers are the ones who exert pressure on the legislative groups.

The significance to the South of a declining demand for American cotton is widespread in its implications. The demand is declining at too fast a pace to permit necessary economic, social, and political readjustments to be easily made. Such adjustments require years for their accomplishment. A declining foreign market means that domestic demand must be relied upon. Unless domestic demand is increased, and increased rapidly, to replace the vanished foreign markets, half the cotton land of the South must be used for other purposes, or lie fallow, and half the people engaged in producing, ginning, transporting, compressing, merchandising, and manufacturing the cotton crop must seek other means of livelihood. New uses for cotton cannot be developed soon enough to absorb all the cotton formerly grown for foreign consumption. Of course, all foreign markets for American cotton will not disappear within the space of a few years. Yet, except in years of crop failure abroad, it seems unlikely that we can regain the proportion of the foreign markets formerly held, in spite of much wishful thinking on the subject. The South, therefore, faces a grave problem, and it is not the South alone that will be affected, for the fortunes of the whole country are vitally influenced by the welfare of the 30,000,000 people who live in the cotton South. The National Cotton Council can perform a real service in assisting in the solution of this problem, if its activities are not hampered by lack of funds or by the conflict of interests among the representatives of the cotton trade. Its hope for

success lies principally in the aggressiveness and imagination applied by its leaders.

Efforts to diversify southern farming have been made for many years with disappointing results. Except for the relatively limited number of acres devoted in recent years to tobacco, no adequate substitute providing cash returns has been found. Many have been suggested, such as livestock, corn, dairying, tung nuts, and fruits and vegetables; and some of these have become important commercially. Compared with cotton, however, and the cash income it provides, the results to date are puny indeed. It could not be expected that production of new crops would be accomplished overnight, and it would be unwise to accomplish the change too fast, because new crops in the South, unaccompanied by new uses and new outlets, serve only to accentuate economic dislocation elsewhere.

New uses for cotton would assist in the solution of the problem, and there are many agencies at work developing them. The solution will not be found when one, two, or three new uses are discovered, for they must be developed as profitable business enterprises on a large scale. In view of the fact that it has been estimated to take seven years to plan, introduce, and create a demand for a product,¹ promising developments should not be expected overnight. It is possible, however, that the solution may lie in other directions. We are in an era of great change, and the rapidity of scientific progress in research is almost incredible. Tests have been made at the University of North Carolina to demonstrate the feasibility of harvesting mechanically the entire cotton plant, including stalks, leaves, bolls, as well as lint cotton, for use as raw material for cellulose products. Such a use as this, developed on a large scale, would change the way of life in some parts of the South, but the soil could still be tilled to earn cash income. It should be remembered, however, that new uses are frequently stimulated by relatively low prices. Furthermore, large amounts of capital will hardly be attracted to a product when its prices are controlled or pegged by the government.

One of the encouraging features of the situation is the fact that so many people are aware of the problem and are working on solutions from a variety of viewpoints. Any broad and sweeping

¹ Stanley Resor, president of the J. Walter Thompson Co., in the Carroll J. Swan Memorial Lecture on Advertising at the Harvard Business School, May 12, 1938.

change is always deplored at the beginning, but unless it comes with catastrophic suddenness, adaptations can usually be made if those concerned are aware of the nature of the problem. There is also the possibility that such a wide understanding of the problem may be influential in forcing the small farmer to produce more sustaining crops and to diminish the importance of raising a cash crop to pay the bills for his food. Government control, regardless of its effect on American cotton prices in the world market, at least may be of lasting benefit in educating farmers, in forcing scientific control and technique, and in encouraging the diversification of crops.

It appears, therefore, that the cotton farmer of the South will become increasingly dependent upon American industry to purchase his cotton crop each year. This means that in the next few years, the American cotton-textile industry must be the chief source of income for the cotton farmer. Such a relationship is similar to the blind leading the blind, because the cotton-textile industry has been in serious difficulties for a number of years. One of the almost hopeless aspects of the situation is the momentum of such a large industry when headed for bankruptcy. To turn the direction of such a large group of individual enterprises is a colossal task, but to say that it is impossible would impugn the courage and initiative of American business, which has demonstrated these virtues in the past to a remarkable degree.

As in the case of the cotton farmer, there are many readjustments ahead for the textile industry, and many problems to be solved. Like the cotton farmer, the textile industry cannot depend on the export market. In the past this market has constituted an outlet for less than 10% of the products of the American textile industry, and it will be more likely to decrease than increase. Japan is taking over the Far Eastern markets and encroaching on some of the Central and South American markets which Americans have dominated previously. It is improbable, therefore, that expansion of export markets will provide a solution to the problems of the industry.

The financial position of the industry, which has been precarious, depends upon a satisfactory solution to the problems of overcapacity and unsound marketing functions and organization. The problems are mutually interdependent, but it is improbable that new capital will flow into the industry either to rehabilitate

existing organizations or to establish new and more efficient mills, until the situation improves to the point where returns on capital investment are satisfactory.

The problem of overcapacity is serious, particularly because of its effect on price stability. There seems to be no doubt that there must be some liquidation of spindleage, principally of obsolete equipment. As solutions to the problem, the suggestions that all obsolete spindles be purchased by the government or that an absolute dictatorship over the industry be established are both unpalatable and unsound. The arguments for these solutions reduced to simple terms are merely that supply exceeds demand; therefore, willy-nilly, supply must be reduced. The other side of the equation is just as important, and equivalent amounts of money should be spent for the purpose of increasing demand. By such a means, equilibrium may be reached at a higher level of operation than by overemphasizing the supply side.

Part of the solution to the problem of overcapacity might be found in new fabrics. It is not inconceivable to visualize the cotton-textile industry, the woolen industry, the silk industry, and the rayon industry not as separate from one another, but as a single industry, spinning and weaving various combinations of wool, rayon, and cotton in the production of new and attractive fabrics. Many of the mills formerly producing cotton fine goods exclusively now produce all-rayon or cotton-and-rayon mixtures. This solution would not be to the best interests of the cotton farmer unless there was a substantially increased production of cotton, plant and all, for use as the raw material for rayon production.

The increased use of products of the cotton-textile mills also depends in large part upon some changes and readjustments in the marketing of cotton goods. To be successful in increasing demand, efforts must be exerted not only to find out what the consumer wants and to produce it, but also to create new products to attract new consumers. The separation of the marketing functions from the cotton mills makes this goal extremely difficult to achieve. Close coordination between the producing and selling functions seems necessary, and possibly some mills must be liquidated. But these steps alone are not enough. In addition, there must come into play again all the imagination, skill, and adventuring spirit which built up the great American industries

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over the last hundred years. The depression of the '30's with its concomitant of government control, subsidies, loans, and production curtailment is not a healthful starting point for the rehabilitation of an industry. But depression psychology will give way in time to greater confidence, and when that time comes, it is to be hoped that businessmen will again go adventuring in a state of mind to find new uses, new outlets, and new products, with the imagination, skill, and financial backing necessary to bring about accomplishment in ways that can only be dimly indicated in the confused and troubled days of 1939.



CHAPTER V

THE GRAIN TRADE

There are seven types of grain of commercial importance produced in the United States: namely, wheat, corn, barley, oats, rye, flaxseed, and rice.¹ These different grains have many points in common in type of cultivation and harvesting, and particularly in marketing, although the characteristics differ widely in detail. Of these grains, wheat is by far the most important commercially, although corn acreage is double that of wheat. Probably less than one-fifth of the large corn crop enters commercial channels as shelled corn; the rest is consumed on the farm where it is grown. The other grains are less important and are produced on a smaller scale. Rice is distinctive in that it is not grown in the same general areas as the other grains, but is grown in a warmer climate and is confined to rather restricted localities adjacent to rivers or other sources of large water supplies which permit the rice fields to be flooded at intervals.

IMPORTANT TYPES OF GRAIN

Wheat.—Wheat is grown in every state of the union under a variety of conditions, although commercial wheat production is confined to a smaller area. Wheat is not so difficult to classify or grade as cotton, wool, or tobacco, since the yield from a single plant or a single field of wheat does not vary widely. There are, however, over 200 distinct varieties of wheat grown in this country.² These varieties have been classified by the geographical area in which they are produced, by the season of the year in which the seed is planted, by the color of the kernels, and by the degree of hardness of the kernel.

There are now seven official classes of wheat approved by the Secretary of Agriculture under the authority of the U. S. Grain

¹ In the grain trade soybeans are also included as a grain.

² U. S. Department of Agriculture, Technical Bulletin No. 459, *Classification of Wheat Varieties Grown in the United States*, by J. A. Clark and B. B. Boyles (Washington, April, 1935), p. 1.

Standards Act¹ passed in 1916. These classes are: (1) Hard Red Spring Wheat, (2) Durum Wheat, (3) Red Durum Wheat, (4) Hard Red Winter Wheat, (5) Soft Red Winter Wheat, (6) White Wheat, and (7) Mixed Wheat.² The "Mixed Wheat" classification is provided to identify any class of wheat which contains more than 10% of any other class of wheat. There are subclasses under each of these major classes, and a description of grade factors is applied to indicate the condition of the wheat.

The Hard Red Wheats are grown in the largest quantities, the Soft Red Wheats are next in importance, and the Durum varieties and White Wheats are produced in smaller quantities. The percentage of the total wheat acreage in the United States occupied by each of these various classes of wheat is shown in Exhibit 1.

EXHIBIT 1
PERCENTAGE OF TOTAL WHEAT AREA OCCUPIED BY CLASSES OF WHEAT,
UNITED STATES, 1919-1934

Class	1919	1924	1929	1934
Hard Red Spring.....	24.2	22.4	22.0	23.2
Durum*.....	6.4	8.2	9.4	4.6
Hard Red Winter.....	32.0	41.4	43.5	44.6
Soft Red Winter.....	30.1	22.1	17.7	20.9
White.....	7.3	5.9	7.4	6.7
Total.....	100.0	100.0	100.0	100.0

* Including Red Durum.

Source: U. S. Department of Agriculture, Circular No. 424, *Distribution of the Varieties and Classes of Wheat in the United States in 1934*, by J. A. Clark and K. S. Quisenberry (Washington, April, 1937), p. 35.

The actual production of the various classes in recent years is shown in Exhibit 2.

The habit of growth of the wheat plant is an important characteristic and determines the area in which any given class of wheat will be grown. Winter wheat is planted in the fall and harvested in the late spring or early summer. Such wheat can be grown only in localities where the climate is not so severe as to kill the wheat in its dormant period during the winter. Spring wheat is planted in the spring and harvested in the summer.

¹ Public No. 190, Sixty-fourth Congress, 39 U. S. Stat. 446,482.

² U. S. Department of Agriculture, Bureau of Agricultural Economics, *Handbook of Official Grain Standards of the United States*, U.S.G.S.A., Form No. 90 (Washington, Government Printing Office, 1937).

The texture of the wheat kernel is another important characteristic. The first wheat grown in this country was soft. As milling technique improved and hard wheat could be ground to produce white flour, the production of hard wheat increased. A higher degree of hardness usually results from a relatively higher proportion of gluten to starch; this characteristic makes the hard wheat valuable as a bread flour. The color is used only in a descriptive sense to indicate the variety rather than the quality of wheat.

EXHIBIT 2

PRODUCTION OF WHEAT IN THE UNITED STATES, BY CLASSES, 1925-1937
(In thousands of bushels)

Year beginning July	Hard Red Spring	Durum	Hard Red Winter	Soft Red Winter	White	Total
1925	165,780	60,377	204,171	162,962	75,410	668,700
1926	123,282	45,320	371,178	215,709	76,724	832,213
1927	206,679	81,423	322,322	166,592	98,043	875,059
1928	202,803	99,008	394,110	127,393	91,059	914,373
1929	145,621	57,117	371,076	164,400	85,003	823,217
1930	157,378	59,522	403,609	179,692	86,269	886,470
1931	72,439	22,099	514,035	262,006	71,095	941,674
1932	189,939	42,252	280,450	159,214	85,072	756,927
1933	106,469	17,816	176,997	162,313	88,088	551,683
1934	53,279	6,891	207,860	188,602	69,761	526,393
1935	107,975	24,759	203,232	204,256	86,122	626,344
1936	50,742	8,836	259,775	207,410	100,003	626,766
1937	101,393	28,929	373,371	257,838	114,145	875,676
1938*	161,440	42,010	387,610	236,800	102,941	930,801

* Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics*, 1938 (Washington, Government Printing Office, 1938), Table 10, p. 19; and U. S. Department of Agriculture, *Crops and Markets* (Washington, December, 1938), Vol. 15, No. 12, p. 266.

Hard Red Spring Wheat is grown in the North Central states where the winters are so severe that winter wheat, planted in the fall, would be killed by the cold weather. There are three subclasses, Dark Northern Spring, Northern Spring, and Red Spring. The subclasses are divided on the basis of the percentage of dark, hard, and vitreous kernels, and the percentage in each sample of the Humpback variety, a very poor milling grain. The principal varieties of Hard Red Spring Wheat are Marquis and Ceres, which together accounted for 92% of the acreage planted to Hard Red Spring Wheat in 1934.¹ Ceres is a high-yielding wheat, resistant

¹ U. S. Department of Agriculture, Circular No. 424, p. 37.

both to stem rust and to drought. It was first distributed in 1926 and has since become one of the important Hard Red Spring Wheat varieties.¹ Since 1934 the Thatcher variety has become even more important.

Durum Wheat is produced principally in North Dakota. It is a spring wheat with a high percentage of protein which makes it unsatisfactory for bread making. Production has declined substantially in recent years. Durum is used principally in the manufacture of semolina flour, which is used to prepare macaroni and spaghetti. Although the export market formerly took one-third of the production, exports have been negligible since 1932. Durum Wheat is divided into two classes, Durum, which is predominantly an amber color, and Red Durum, the kernels of which are predominantly red. The subclasses of Durum Wheat are Hard Amber Durum, Amber Durum, and Durum. There are no subclasses of Red Durum.

Hard Red Winter Wheat, which is grown principally in Kansas, Nebraska, Oklahoma, and the Panhandle region of Texas, constitutes the most important class of wheat grown in the United States. This wheat is planted in the fall and harvested in the late spring or early summer. Because of the wide range of growth, the degree of hardness and the range of color vary widely, depending on the soil and climate of the area in which the particular variety² is grown. The three official subclasses, Dark Hard Winter, Hard Winter, and Yellow Hard Winter, differentiate this class.

Soft Red Winter Wheat, the oldest class of wheat grown in the United States, is used principally in fine cake and pastry flours. This wheat is grown for the most part in the eastern half of the United States, the chief producing areas being Ohio, Indiana, and southern Illinois. Some is grown in the Pacific Northwest, and this geographical distinction is the basis for the division of this class into two subclasses: Red Winter Wheat, which can include not more than 10% of wheat grown west of the Great Plains area; and Western Red, which contains more than 10% of the wheat grown

¹ U. S. Department of Agriculture, Technical Bulletin 459, p. 113.

² Turkey is the most important variety of hard red winter wheat, although its importance has declined since 1919, when over 98% of the total grown was of this variety. Other newer varieties include Blackhull, Kanred, and Nebraska No. 60. These four occupied 95% of the total acreage planted in 1934 in Hard Red Winter Wheat.

west of this area. This class comprises more varieties than other classes include; in 1934 more than 100,000 acres were planted with 23 varieties of this wheat.¹

White Wheat is grown principally in the Pacific Northwest and in California. Until recently it was exported in substantial quantities. The White Wheat grown in the East is used for the

EXHIBIT 3
PRINCIPAL WHEAT-PRODUCING COUNTRIES, AVERAGE PRODUCTION FOR
1925-1926 TO 1929-1930, AND FOR 1935-1936, 1936-1937, AND
1937-1938
(In millions of bushels)

Country	Average 1925-1926 to 1929-1930	1935-1936	1936-1937	1937-1938*
United States.....	822.7	626.3	626.7	874.0
U.S.S.R.....	790.9	1,132.8†	.....	.....
Canada.....	430.7	281.9	219.2	182.4
India.....	320.5	363.2	351.7	366.2
France.....	291.4	285.0	254.6	253.5
Argentina.....	243.0	141.0	249.2	184.0
Italy.....	229.2	283.9	224.6	296.0
Spain.....	146.2	158.0	121.5	.....
Australia.....	136.0	144.2	150.6	180.5
Germany.	119.8‡	171.5‡	162.7	164.1
Rumania.....	105.5	96.4	128.7	138.2
Yugoslavia.....	81.0	73.1	107.4	86.3
Hungary.....	79.5	84.2	87.8	69.9
Turkey.....	67.6	92.6	138.5	140.3
Poland.....	60.5	73.9	78.4	67.6

* Preliminary.
- Official estimate, probably not comparable.
‡ Excludes the Saar.
Source: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 5, pp. 15-17. *Ibid.*, 1938, Table 6, pp. 16-17.

manufacture of cereal products and for poultry feeds. In habit of growth White Wheat varieties may be either winter or spring, and either hard or soft, but they are always white in color. The subclasses are Hard White, Soft White, White Club, and Western White.

Mixed Wheats result from reseeding winterkilled wheat, from cross-pollination in fields where different classes are produced in adjacent areas, or from accidental mixture by the farmer or by one of the smaller buyers when the wheat is being marketed.

¹ U. S. Department of Agriculture, Circular 424, p. 50.

Wheat is grown in significant amounts in many countries, since its use as a staple food makes it one of the most important crops of the world. For many years the United States was not only the most important wheat-producing country but also the most important exporter. Since 1933, the Union of Soviet Socialist Republics has apparently taken first rank as the foremost wheat producer of the world,¹ and since the World War Canada has exported annually a larger amount of wheat than has the United States. Because of the drought and restriction programs, the United States was a net importer of wheat in 1934, 1935, and 1936. Statistics on production in the principal wheat countries are shown in Exhibit 3.

The wheat-producing areas do not follow geographical boundaries, since the wheat region of north central North America includes not only the hard spring wheat areas of the United States in the states of Montana, North and South Dakota, and Minnesota, but also the Prairie Provinces of Canada, Manitoba, Saskatchewan, and Alberta. In the Danube Basin of southeastern Europe, an important wheat-producing region, the countries of Hungary, Yugoslavia, Bulgaria, and Rumania are included. For obvious reasons, statistics are available only by countries, but for some wheat-producing regions, such as India, France, Italy, Australia, and Argentina, the statistics for the particular country are in fact the statistics for the region.

During the past fifty years acreage has expanded considerably in the newer wheat-producing areas such as the Prairie Provinces, Australia, Argentina, and in the hard winter and spring wheat-producing areas of the United States. Acreage has also expanded in some of the older producing areas such as India and southeastern Europe. In Italy, France, northern Europe, and in the general farming areas in the eastern portions of the United States, where wheat is not the only and most important crop produced on the farms, acreage has either remained at approximately the same levels or has declined.²

The principal wheat-producing regions in the United States, as described above, are classified roughly according to the types of

¹ Data for production in the U.S.S.R. since 1933 have been given only in official government estimates, which for political reasons probably are reported somewhat higher than the impartial estimates formerly available.

² Stanford University, Food Research Institute, *Wheat Studies*, Vol. 14, No. 3, November, 1937, pp. 74-75.

wheat produced. The principal wheat-producing states and the important types of wheat grown in these states are shown in Exhibit 4.

EXHIBIT 4
PRINCIPAL TYPES OF WHEAT PRODUCED, BY STATES: AVERAGE,
1927-1936; ANNUAL, 1937 AND 1938
(In millions of bushels)

State	Winter			Durum			Spring*			Total		
	Aver- age 1927- 1936	1937	1938	Aver- age 1927- 1936	1937	1938	Aver- age 1927- 1936	1937	1938	Aver- age 1927- 1936	1937	1938
Kansas.....	133.5	158.1	152.2				0.2			133.7	158.1	152.2
North Dakota.....				29.4	23.0	31.1	51.9	34.0	48.8	81.4	57.0	79.8
Nebraska.....	46.4	45.7	52.8				2.4	1.5	2.9	48.8	47.2	55.7
Oklahoma...	44.0	65.5	58.3							44.0	65.5	58.3
Montana.....	9.3	6.4	24.6				31.9	15.5	47.8	41.2	21.9	72.3
Washington..	26.2	17.0	32.3				17.7	33.9	19.3	43.9	50.8	51.6
Texas.....	30.0	41.7	35.0							30.0	41.7	35.0
South Dakota	1.4	1.1	1.6	8.5	3.6	7.9	16.9	10.7	18.3	26.8	15.4	27.8
Illinois,...	31.6	45.2	42.0				1.8	0.5	0.6	33.4	45.7	42.6
Ohio.....	34.6	46.1	46.3				0.2		0.1	34.8	46.1	46.4
Idaho.....	12.4	14.4	17.5				12.4	14.0	12.3	24.7	28.4	29.8
Indiana.....	27.7	34.6	30.1				0.2	0.1	0.1	27.9	34.7	30.2
Oregon.....	14.9	8.6	15.9				5.0	11.8	7.7	20.0	20.4	23.6
Minnesota..	2.9	6.2	3.5	2.1	1.3	1.5	14.3	28.2	33.4	19.4	35.8	38.9
Missouri.....	21.6	42.4	31.5				0.1	0.1	0.1	21.7	42.5	31.6
Pennsylvania	17.7	23.4	21.9				0.2	0.2	0.1	17.9	23.6	22.0
Colorado.....	9.7	10.4	14.6				4.2	4.7	4.8	13.8	15.2	19.4
Total other states...	82.5	119.0	106.5				7.0	6.7	7.4	89.5	125.7	113.6
Total United States...	546.4	685.8	686.6	40.0†	27.9†	40.5†	166.4	161.9	203.7	752.9	875.7	930.8

* Other than Durum.
† Total three states.
Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 12, p. 267.

The recent decline in production in the Dakotas, Montana, Colorado, Kansas, Oklahoma, and Texas was a result of the severe droughts in 1934 and 1936. Consequently, the recent figures should not be taken as indicative of longer trends.

The hard winter wheat region of the Southwest can be classified in three subdivisions according to the types of farming. These are: (1) the wheat and range livestock region of western Kansas and eastern Colorado; (2) the specialized wheat-growing region located in the Panhandle region of Texas and Oklahoma, the western half of Kansas, and western Nebraska; and (3) the general farming region of central Kansas and north central Oklahoma.¹

¹ U. S. Department of Agriculture, Agricultural Adjustment Administration, *Regional Problems in Agricultural Adjustment* (Washington, March, 1935), pp. 57-58.

Similar subdivisions can be made in the hard spring wheat-producing area. In this area the wheat and range livestock region includes western North Dakota, South Dakota, and Montana; the specialized wheat and small grain region includes the northern and central portions of North Dakota and extends into South Dakota; and the general farming territory centers in southeastern North Dakota and the adjoining areas in South Dakota and Minnesota.

In the white wheat-producing region of the Northwest wheat is the principal crop, although considerable white wheat is grown in California, where other crops are also important. In the remaining regions producing wheat, other farm crops are of greater importance, and wheat is not the sole or even the principal source of cash income.

In the middle of the last century, the center of wheat production was near Columbus, Ohio, and the six states of Illinois, Indiana, Wisconsin, Ohio, Virginia, and Pennsylvania produced well over half the entire crop of the country.¹ The principal type was soft winter wheat, most of which was ground on millstones at village gristmills, although milling centers had developed at Buffalo, Cincinnati, Baltimore, and Philadelphia. As areas in Minnesota and the Dakotas were opened to production, soft winter wheat was planted, but the pioneers soon learned that losses from winterkill prohibited the planting of this type. Spring wheat of a harder variety was planted, but the operators of gristmills did not like this wheat because the increased grinding necessary discolored the flour so that it could not be properly bleached. In the 1870's steel rollers were introduced to grind wheat, and the purifying process was improved. The use of the roller mill process permitted the hard spring wheat to be ground. In fact, it was soon discovered that this wheat could be milled more satisfactorily than soft wheat, and that the flour made from hard spring wheat had a more desirable flavor in bread.²

The demand for flour made from hard spring wheat encouraged the expansion of acreage of this type in the central northwestern

¹ Schmidt, L. B., and Ross, E. D., editors, *Readings in the Economic History of American Agriculture*, Chapter XVIII, "The Westward Movement of Wheat," by L. B. Schmidt (New York, The Macmillan Company, 1925), p. 378.

² University of Minnesota, Studies in Economics and Business, No. 5, *The Decline of Northwestern Flour Milling*, by V. G. Pickett and R. S. Vaile (Minneapolis, University of Minnesota Press, 1933), p. 24.

states. This region soon became the most important wheat-producing area in the country. By 1900 the results of annual cropping were apparent in declining yields per acre, and conditions were aggravated by the increase in wheat diseases such as rust and smut. In addition, durum wheat, which had been introduced in this country in the 1870's, began to be planted in these states because it was hardy and resistant to both drought and disease. As a consequence, some spring wheat acreage was supplanted by the increased number of acres planted to durum. Another difficulty which appeared in the areas devoted exclusively to wheat was the increase in weeds harvested with the grain. All these factors combined to reduce the production of hard spring wheat in the Central Northwest.

In the meantime the Turkey variety of hard winter wheat had been introduced in Kansas, where only soft winter wheat had been produced formerly. The area planted to hard winter wheat expanded until it comprises today the hard winter wheat region described above.

Corn.—As has been pointed out above, the major proportion of the corn crop is fed to livestock.¹ Only an estimated 12% to 20% enters commercial channels. Of the corn grown on the farm, some is raised for grain corn, where the size of the ear is important, and some is raised for ensilage, where the size of leaf and stalk is as important as the size of the ear. The grain corn may be used on the farm, sold to others in a near-by community, or shipped to market. Transportation charges prevent the sale of corn for commercial purposes from all the 48 states, and as a consequence commercial corn is derived largely from the producing areas, such as Illinois, Iowa, Minnesota, Indiana, and Ohio, which are adjacent to terminal markets.

The types of corn are not so varied as those of wheat, and there are only three official classes of corn in the United States: Yellow, White, and Mixed.² The distinction is of principal importance to the manufacturers of cereals and corn food products, since the industries producing corn syrup, cornstarch, and dextrose can use any type of corn. Feeders prefer Yellow Corn since they believe it to have better feeding qualities, and 80% of the corn

¹ See section on "Relationship between Corn Crop and Livestock Production" in Chapter III, pp. 78-81.

² U. S. Department of Agriculture, *Handbook of Official Grain Standards of the United States*, p. 20.

arriving in the Chicago market is of this color. White Corn receipts have decreased in recent years, and whereas 25% of the total receipts formerly were White Corn, the percentage is now approximately 10% to 15%.

Commercial corn is of two varieties, Flint or Dent.¹ Flint corn has a kernel too hard to be used for livestock, but one which can be ground readily by the mills. The Argentine corn, as well as that grown in Manchuria and South Africa, is principally of the Flint variety. Dent corn is soft enough to be used as feed, and is the principal variety produced in this country.

EXHIBIT 5

PRINCIPAL CORN-PRODUCING COUNTRIES: PRODUCTION, AVERAGE, 1925-1926 TO 1929-1930; ANNUAL, 1935-1936, 1936-1937, AND 1937-1938
(In millions of bushels)

Country	Average 1925-1926 to 1929-1930	1935-1936	1936-1937	1937-1938*
United States.....	2,629.6	2,303.7	1,507.1	2,645.0
Argentina.....	297.4	395.7	359.6	177.2
Rumania.....	176.5	211.8	220.9	186.4
Brazil.....	166.1	214.2	.....	.....
U.S.S.R.....	136.8	110.0	.....	.....
Yugoslavia.....	120.3	119.2	204.0	210.0
Total world.....	4,718.0	4,597.0	4,003.0	4,942.0

* Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 45, pp. 46-47.

Over half the world's annual corn crop is produced in the United States, the harvest in this country having averaged almost 10 times that in Argentina, the second most important producer. Argentina, however, is the most important exporter of corn, since, as pointed out above, very little of the corn crop of this country is exported. Production of corn in the most important producing countries in recent years is shown in Exhibit 5.

Although corn is produced in every state in the union, the Corn Belt, or the important region producing corn for commercial channels, extends only from the western half of Ohio to eastern

¹ Sweet corn and popcorn are two other varieties, but the former is marketed as produce and the latter is of negligible importance compared with other varieties of corn.

Nebraska and from the northeast corner of Kansas to the southeast corner of South Dakota. The two states of Iowa and Illinois usually ship over half the corn moving into commercial channels, and, along with Nebraska, Indiana, Kansas, Ohio, Minnesota, South Dakota, and Missouri, supply over 85% of the commercial crop of corn.¹ The principal producing states are as shown in Exhibit 6.

EXHIBIT 6
PRINCIPAL CORN-PRODUCING STATES: AVERAGE, 1927-1936; ANNUAL,
1937 AND 1938
(In millions of bushels)

State	Average, 1927-1936	1937	1938
Iowa.....	381.7	498.7	468.9
Illinois.....	289.7	449.6	379.4
Nebraska.....	180.3	83.0	107.7
Indiana.....	143.3	213.8	173.4
Minnesota.....	131.4	172.4	157.5
Ohio.....	127.2	163.2	157.0
Missouri.....	117.2	117.7	106.5
Kansas.....	94.6	29.5	45.2
Texas.....	78.0	72.0	75.6
South Dakota.....	64.9	43.8	35.7
Total other states.....	697.8	807.6	835.3
Total United States.....	2,306.1	2,651.3	2,542.2

Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 12, p. 266.

Barley.—The principal commercial use of barley is by the maltsters, in the production of fermented and distilled liquors. It is, however, also used on the farm as feed for livestock in the northern Great Plains region, where it can be grown more readily than corn. The official classes for barley are Barley, Black Barley, Western Barley, and Mixed Barley. Barley, which describes all white barley grown east of the Rocky Mountains, is divided into two subclasses, Malting Barley and Barley. As the name implies, Malting Barley is that suitable for malting, whereas the subclass Barley refers to the remainder of the class Barley. Black Barley includes all varieties with black glumes,² and Western Barley includes white barley grown west of the Great Plains area.

¹ Schultz, T. W., *The Tariffs on Barley, Oats, and Corn* (Madison, Tariff Research Committee, 1933), p. 81.

² Glumes are the scales or covering of the grain which enclose the sexual organs and by which the grain is attached to the spike at the top of the plant.

As in the case of wheat, the Union of Soviet Socialist Republics is first in world importance in the production of barley, and the United States is second. In recent years Germany has been a close third. The principal countries producing barley are as shown in Exhibit 7.

EXHIBIT 7
PRINCIPAL BARLEY-PRODUCING COUNTRIES: PRODUCTION, AVERAGE,
1925-1926 TO 1929-1930; ANNUAL, 1935-1936, 1936-1937, AND
1937-1938
(In millions of bushels)

Country	Average, 1925-1926 to 1929-1930	1935-1936	1936-1937	1937-1938*
U.S.S.R.....	264.7	374.9	.....	.....
United States.....	241.2	285.8	147.5	219.6
Germany.....	131.6	155.6†	156.1†	167.1†
India.....	115.7	117.5	108.7	.....
Canada.....	104.5	84.0	71.9	83.1
Spain.....	93.3	97.1	78.5	.....
Total world.....	2,191.0	2,332.0	2,186.0	2,152.0

* Preliminary.

† Including the Saar.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 78, pp. 70-71.

Minnesota is the most important barley-producing state in this country, accounting for approximately 20% of the crop each year. North and South Dakota rank second and third, each state accounting for approximately 15% of the crop each year. California, which produces maltsters' barley, for the most part, is fourth in importance. Considerable quantities of California barley are exported to European countries, since the California barley makes a heavy beer, acceptable to the European taste. In the three other important producing states the barley which does not meet the requirements of American maltsters is used principally for livestock feed.

Oats.—Oats are very bulky and are less valuable by weight than other grains. Like corn, oats are consumed in substantial quantities on the farm where they are produced. The principal use of oats is as feed for horses and mules. Oats are planted as a nurse crop for grass and in rotation with other crops to replenish the soil. Some oats are used in the manufacture of breakfast

cereals. Three types of oats are recognized in official government standards: Oats, Feed Oats, and Mixed Oats. The type Oats must contain at least 80% cultivated oats and not more than 10% wild oats. Feed Oats may contain 30% to 80% cultivated oats, but at least 65% of cultivated and wild oats combined, or 80% or more of cultivated oats but more than 10% of wild oats. A maximum tolerance of 25% of other grains is permitted in feed oats. Mixed Oats contain less than 30% of cultivated oats, but either (1) not less than 65% of cultivated and wild oats combined or (2) not less than 65% of wild oats. The five classes of oats are White, Red, Gray, Black, and Mixed.

EXHIBIT 8

PRINCIPAL OATS-PRODUCING COUNTRIES: PRODUCTION, AVERAGE
1925-1926 TO 1929-1930; ANNUAL, 1935-1936, 1936-1937,
AND 1937-1938
(In millions of bushels)

Country	Average, 1925-1926 to 1929-1930	1935-1936	1936-1937	1937-1938*
United States.	1,215.5	1,194.9	785.5	1,146.3
U.S.S.R.	987.8	1,258.6†	.....	.....
Germany.	449.7	371.0	387.1	407.8
Canada.	416.6	419.0	288.8	285.2
France.	355.4	307.0	290.4	314.0
Poland.	160.2	179.0	181.9	161.4
England, Wales, and Scotland.	150.3	127.3	120.5	112.3
Total world.	4,679.0	4,727.0	4,014.0	4,437.0

* Preliminary.

† Official estimates; probably not strictly comparable.

Source: U. S. Department of Agriculture, *Agricultural Yearbook, 1938* (Washington, Government Printing Office, 1938), Table 64, pp. 60-61.

The United States has been, until recent years, the principal producer of oats. The Union of Soviet Socialist Republics has apparently surpassed the United States in the production of oats since 1933. Oats are used principally as feed for livestock; only relatively small quantities enter commercial channels. The principal exporters are Argentina, Germany, United States, and Canada. The largest producing countries are shown in Exhibit 8.

Only 25% of the domestic oats crop is shipped out of the country where it is produced. This figure is somewhat higher in

Iowa, Minnesota, and Illinois, which produce the principal portion of the commercial crop.¹ Iowa usually produces approximately 20% of the domestic crop, Minnesota produces 15% of the crop, and Illinois a slightly smaller percentage.

Rye.—There are no official classes established for the type of grain known as rye, although grades have been assigned to designate varying percentages of damaged kernels and foreign materials. The acreage planted to rye is considerably smaller than for any of the grains previously described. Rye is also used as one crop in a rotation system. On the average, over a third of the rye produced is fed to livestock as pasturage or grain on the farm where it is produced, a somewhat smaller percentage is used in the distilling industry, and the remainder is sold commercially for use as feed or to be ground as flour, or retained on the farm for use as seed or to be ground or exchanged for flour.

The United States is not an important producer of rye for the world markets, ranking fifth, and preceded by the Union of Soviet Socialist Republics, Germany, Poland, and Czechoslovakia. Production in the United States is only 5% of the total Russian production and less than 20% of German and Polish production.

Until recent years North Dakota was by far the most important rye-producing state, but the effect of the droughts and the increase in acreage in other states have changed this relationship. In 1937 more rye was produced in Minnesota than in North Dakota, and South Dakota produced almost as much as its sister state. Other important producing states include Wisconsin, Nebraska, Michigan, Indiana, and Illinois.

Flaxseed.—Flax is raised in this country entirely for seed; none of the fiber is used for the manufacture of linen. This country usually imports more flaxseed than it produces to supply its need for linseed oil, the product of crushed flaxseed. Like rye, flaxseed is not divided into official classes, although three grades have been defined.

The United States is the third largest producer of flaxseed, but in recent years imports have exceeded production by a wide margin. The Union of Soviet Socialist Republics raises the largest quantities of flax, although this Russian production is principally for fiber rather than for seed. The principal flaxseed producer is Argentina.

¹ Schultz, *op. cit.*, p. 47.

Minnesota, North and South Dakota, and Montana are the most important states producing flaxseed in this country. These four states usually account for over 90% of the United States production of flaxseed.

Rice.—Although in colonial times rice was a major crop in the Carolinas, today it is produced in commercial quantities only in Louisiana, Texas, Arkansas, and California, in areas which are not suited to the production of other grains. Usually at least one-fourth of the production of rice in this country is shipped to Hawaii, Puerto Rico, and Alaska, where the per capita consumption is many times that of the mainland United States.

The production of rice in the United States is insignificant compared with the production of rice in such countries as China, India, Japan and its possessions, Java, French Indo-China, and Siam. These countries produce from ten to sixty times as much rice as the United States does. Even the Philippines produce twice as much rice as the United States.

Other Grains.—Buckwheat is raised chiefly for flour. The sorghums, such as kafir, milo, and durra, are used for forage and their grains as feed for livestock. All these grains are used in mixed feeds. New York and Pennsylvania produce approximately two-thirds of the buckwheat grown in this country. Texas produces approximately half the grain sorghums grown in this country. Kansas and Oklahoma are also important producers of grain sorghums.

THE PRODUCTION OF GRAINS

The planting, cultivation, and harvesting of wheat, oats, rye, and flax are very similar, but the cultivation of corn and rice varies from that of the small grains. Consequently, the cultivation of wheat will be described as illustrative of the techniques employed in the production of the small grains, and the production of corn and rice will be discussed separately.

Wheat Planting.—On the majority of farms in the wheat areas, wheat is the principal, if not the only, source of cash income. As a consequence, wheat is planted on the land as frequently as possible. Rotation in which other small grains are frequently used is necessary to eliminate weeds and to conserve the soil, and summer fallowing¹ is also frequently utilized to achieve the same results.

¹ In summer fallowing, the land is kept under cultivation during a season without producing a crop.

Rotation is also necessary to derive the greatest benefit from the fertilizer applied to the land.¹ Commercial fertilizer as well as farm manure is applied, both to the rotating crops and to wheat. The costs of commercial fertilizer and the fact that the crop can be grown without it have kept the use of fertilizer in the grain-producing states at a level far below that of the cotton-producing states, where fertilizer is essential to produce a satisfactory crop.

The soil is prepared for the wheat seed by plowing and then smoothing with a disc harrow or cultivator. Wheat and the other small grains were formerly sown by scattering the seeds broadcast, but now the majority of the small grains are planted by a drill. The seed is planted in rows from 6 to 10 inches apart, made by the series of 10 to 28 hoes which comprise the drill. As the seed is dropped into the furrow a wheel placed behind the hoe presses the soil over the seed. The press drill is used most frequently, since the full power of the tractors is not required for seeding and the tractors can pull the heavy weight of the press attachment with little possibility of overloading.²

On the average, $1\frac{2}{3}$ bushels of wheat an acre are sufficient for seeding, although conditions vary on different farms, and the number of seeds in a bushel varies with the type and variety of wheat. Approximately the same proportion holds for the other small grains, two bushels an acre being recommended for barley.³ If the seed is broadcast, increased quantities of seed for each acre are necessary.

Wheat Cultivation.—Wheat and the other small grains are not cultivated while growing, although sometimes the fields are harrowed before the plants germinate, and sometimes winter wheat fields are rolled after the frost is out of the ground to facilitate harvesting operations at a later date. The lack of cultivation during the growing season, in addition to the fact that the grain is not harvested until the heads are ripe, accentuates the problem of weeds and weed seeds in the harvested grains.

During the growing season the wheat may be affected both by fungus diseases and by insect pests. The most devastating fungus

¹ Hunt, T. F., *The Cereals in America* (New York, Orange Judd Company, 1907), p. 74.

² Montana Agricultural Experiment Station, Bulletin No. 295, *Economic Changes in Montana's Wheat Area*, by E. A. Starch (Bozeman, January, 1935), pp. 37-38.

³ University of Minnesota, Agricultural Extension Division, Special Bulletin No. 135, *Barley in Minnesota* (Revised September, 1935), p. 12.

diseases are rust, scab, and smut. Rust, which grows on the plant, is encouraged by hot, moist weather during the ripening of the wheat. Scab destroys the wheat as it is ripening, but smut develops from spores adhering to the seed and is not apparent until the plant flowers. The chief insect pests are the chinch bug and the Hessian fly. These insects feed upon and destroy the growing wheat plant.

Wheat Harvesting.—In the harvesting of small grains, mechanical implements have been introduced on a larger scale than for any other agricultural commodity. The flat plains of Kansas, Texas, and Oklahoma and the rolling, treeless terrain of the Dakotas and Montana are conducive to large-scale farming and the use of labor-saving machinery. Grain was formerly harvested by hand with a scythe, and the straw was then flailed by hand to separate the grain from the stalks of the plant. Today one machine, the combine, performs these operations in the field.

The first important horse-drawn machinery designed to harvest the small grains was the reaper, developed by McCormick and others in the 1830's.¹ This machine was a mower which cut the stalks of the grain near the ground where they were later picked up by the binders. Another machine, the header, was later developed and used in California after 1860.² This machine cut off the tops of the wheat, thus eliminating the necessity of binding. The header could not be used unless the grain was completely ripe, whereas the reaper would harvest wheat which could be cured on the fields in shocks before stacking or threshing.

Later, automatic binders for grain were developed and improved. Wire was first used for binding but was abandoned in favor of twine. The next improvement, the combined harvester and thresher, was developed and introduced in California in 1880.³ The combine, which was drawn by a team of from 18 to 24 horses, soon was used over a widespread area in this state. Some combines powered by steam were also used. As California became a less important factor in the production of wheat in this country, the use of the combine declined.

¹ University of California, Publications in Economics, Volume 9, *The Introduction of Farm Machinery*, by Leo Rogin (Berkeley, University of California Press, 1931), pp. 72-73.

² *Ibid.*, pp. 103-106.

³ *Ibid.*, pp. 119, 125.

In the 1920's, following the introduction of the tractor to power farm machinery, combines were once more in demand. It was estimated that there were 8,274 combines in Kansas in 1926; the number had increased to 20,000 by 1928.¹ With the increased use of tractors and combines farmers then had to concentrate on the production of crops which would yield a net cash return in order to permit them to make payments on this expensive agricultural machinery. In other words, wheat farming became a large-scale business enterprise requiring a heavy capital investment, and the necessity for an annual cash income was obvious.

The introduction of the combine and also the increased use of tractors in the 1920's were events of great significance in the Wheat Belt. Coming in a period when there was a strong demand for wheat in the export markets, acreage was expanded and much new land was plowed and planted to wheat. Some of the land probably should not have been planted, since once it was disturbed by the plow, it was an easy prey to wind erosion. The soil did not contain sufficient organic material to hold it together.² The cost of the mechanical equipment made it more economical to operate large farms, and the farmer had new problems of machinery maintenance, obsolescence, and payment not only on machinery and equipment but on the ever-present mortgage on his land.³

With such a heavy investment in equipment and land, and with operations geared to an ever-increasing production, the wheat farmer was severely affected by the decreased demand for his product and the extremely adverse weather conditions of the 1930's. When the price for wheat declined below 50 cents a bushel, the farmer was in dire straits, but when his equipment was buried with soil blown by the same winds which had stripped his fields, he was a figure of tragedy.

Corn.—The soil for corn is plowed deeper than that for small grains, and corn is planted in rows from three to six feet apart. Unlike the small grains, corn is cultivated while it is growing,

¹ U. S. Department of Agriculture, Bureau of Agricultural Economics, *Wheat Facts*, Part I (Washington, Mimeographed, July, 1930), p. 7.

² U. S. Department of Agriculture, Agricultural Adjustment Administration, *Agricultural Conservation, 1936* (Washington, Government Printing Office, 1937), pp. 31-32.

³ Peterson, C. W., *Wheat—The Riddle of the Markets* (Calgary, Farm and Ranch Review, Ltd., 1930), p. 76.

since the corn plants develop more slowly and weed growth must be checked.

The harvesting of corn is done principally by hand when the ear is harvested for grain, although the whole plant is cut when the corn is to be used for silage. After the harvest, the ears are stored in corn cribs until the grain is dry enough to be shelled. A mechanical corn picker introduced in 1911 is now used to a considerable extent on the large farms in the Corn Belt. This picker is a heavy machine, requiring much power, and misses many ears if the corn is too ripe.¹ This machine also is used for husking. When the corn is "hogged down," the grain is left standing in the field and livestock are turned in to forage.

Rice.—Rice is grown in warm, moist climates. In addition, rice must have large supplies of water, the equivalent of 45 inches of rainfall during the growing season. More than half the water requirement is usually supplied by irrigation.² The water is required not only because it supplies moisture but also because it is an effective means of killing weeds.

Except for the supply of water, the cultivation of rice is similar to that of other grains. The gang plow, disc harrow, seed drill, and twine binder were all adapted to the cultivation of rice.³ Like the other grains, rice must be rotated with other crops to eliminate weeds and particularly the red rice, which is undesirable.

The weed problem is most serious where the seed is sown broadcast and tilling is not possible. Rice seed to be sown broadcast must be "clayed" by plastering the rice seed with a coating of clay and chalk to prevent the seed from floating away when the fields are flooded.⁴ Rice matures in about ninety days, and is then harvested by a binder, shocked, and left in the fields to dry. When dry, the rice is threshed and the rice in the husk, known as "paddy rice," is then sacked for storage⁵ or for sale.

¹ U. S. Department of Agriculture, Bureau of Agricultural Economics, *The Corn Picker in the Dakotas* (Washington, Government Printing Office, 1926), pp. 1-8.

² Hunt, *op. cit.*, p. 365.

³ U. S. Department of Agriculture, Division of Botany, *The Present Status of Rice Culture in the United States* (Washington, Government Printing Office, 1899), p. 22.

⁴ In the days of rice culture in South Carolina, this process was performed by placing rice seed and clay on the barn floor where it was thoroughly mixed as negro girls danced and shuffled on it with bare feet. Sass, Herbert R., *A Carolina Rice Plantation of the Fifties* (New York, William Morrow & Co., Inc., 1936), p. 28.

⁵ This procedure is followed except in Arkansas where the rice is warehoused in bulk, since this rice is somewhat harder, less moist, and does not require the airing desirable in the case of rice grown in other areas.

FINANCING THE PRODUCTION OF GRAINS

The financing of the production of grains is done on a smaller scale than the financing of the production of cotton. The principal form of financial assistance to the grain farmer is through mortgages on the farm and chattel mortgages on some of the larger pieces of equipment purchased on a long-term installment plan. Commercial banks in the past have seldom made loans on the growing crops, although such loans are now being made through the Federal Crop Insurance Corporation to cover the premium payment or to care for the insured crop. This insurance was written for the first time on the wheat crop harvested in 1939, and the farmer was thereby insured for three-fourths of a normal yield.

Production Credit Associations operating under the Farm Credit Administration make loans to farmers to finance the growing of crops. Another Farm Credit Administration agency, the Emergency Crop and Feed Loan Section, has been more important in the extension of credit to wheat farmers. The maximum amount permitted to one borrower is \$400, and actual loans for seed or for the care of the wheat crop have averaged less than this amount. In one county in Kansas, it is estimated that the loans from this source ranged from \$25 to \$200 a borrower; a lien on the crops is taken as collateral for these loans. Unsecured loans were also made by this agency for drought relief.

Loans made on Federal Crop Insurance policies can be used only for seed and the care of the wheat crop. Farmers with good credit can, of course, borrow money from local banks for living expenses and other purposes during the period of the loan. The commercial bank loans usually mature at harvest, and the farmer pays the bank when he sells his wheat at the local elevator.

MARKETING OF GRAIN AT COUNTRY POINTS

The marketing of wheat, corn, rye, barley, oats, and flaxseed at country points is quite similar, although the marketing of rice is carried on through different channels. Farmers usually sell their corn and small grains, except rice, to a local elevator located on a near-by railroad. The increased use of the truck by the farmer for the delivery of grain has increased his trading area, however, and this change in the form of transportation has

been one of the major factors in the decline in number of local elevators in recent years. The introduction of the combine also resulted in some changes in marketing practices, since the crop was harvested in a shorter period of time, thus taxing the storage capacities of the local elevators and the transportation facilities used to carry the grain to market. It has been estimated that 50% of the wheat crop moves to market in July and August.¹ Elevators buying corn are in a more favorable position, since corn is usually marketed later in the year, after the peak movement of other grains.

The local elevators are the principal assemblers of grain in the country markets. In 1929, 81.5% of the grain assemblers were elevators doing 64% of the total volume of business of all assemblers.² The most important of the other assemblers is the warehouse, which is the principal assembler in the Pacific Northwest, where a large proportion of the grain is sacked rather than sold in bulk. The warehouse is similar to the elevator in its functions of purchasing grain from the producers, storing grain for its own account, and shipping it to buyers in other markets. Other country buyers include country track buyers,³ scoop-shovelers,⁴ representatives of grain processors and terminal market grain dealers, and local buyers such as merchants, feed dealers, or stock raisers. None of these buyers own elevators, and some are important only in highly restricted areas.

The function of the local elevator is to receive the grain from the farmer and ship it in carload or truckload lots to the terminal markets. In addition, these elevators store the grain temporarily. Sometimes the grain is cleaned and conditioned; frequently the grain, particularly wheat, is mixed to improve the grade. Some elevators in the Corn Belt states grind grain for feed. More than 60% of the elevators carry on a retail business as a side line in such items as coal, feed, and other farm supplies.⁵

¹ U. S. Bureau of the Census, 15th Census of the United States, Census of Distribution, Agricultural Commodity Series, *Distribution of Grain* (Washington, Government Printing Office, 1934), p. 10.

² *Ibid.*, p. 11.

³ Track buyers purchase grain, from either farmers or local elevators after it has been loaded into the cars.

⁴ Scoop-shovelers transfer farmers' grain into railroad cars directly from wagons or trucks and have no storage or elevating equipment.

⁵ U. S. Bureau of the Census, *op. cit.*, p. 16. Also see Purdue Agricultural Experiment Station, Bulletin No. 403, *An Economic Analysis of Local Grain Elevators in Indiana* (Lafayette, July, 1935); North Dakota Agricultural Experiment Station,

Local elevators are divided by the type of control and ownership into three classes: (1) independent or privately owned elevators, (2) farmers' cooperative elevators, and (3) line elevators. Independent elevators are privately owned and operated, while the cooperative elevators are owned and operated by groups of farmers who receive patronage dividends based on the value of grains marketed through that elevator. There are numerous cooperative elevators which are organized on a stock-dividend basis and for all practical purposes are really independent elevators whose entire stock is owned by farmers. There are some cooperative elevators operated on the basis of a line organization. Line elevators are chains of elevators operated by a central organization such as a grain company, a grain dealer, or by a mill or milling company. The line elevators usually are located along a single railroad line. Many of them were established when the railroads, as they were being extended, gave an exclusive right to a single company to build elevators at specified distances along the railroad line. Exhibit 9 shows the distribution of the various types of elevators in 1929.

EXHIBIT 9
GRAIN ELEVATORS, BY TYPES, 1929

Type	Number	% of total	Total volume of business, in millions of dollars	% of total
Independent.....	2,899	30.6	\$ 317	29.5
Cooperative.....	2,541	26.9	438	40.7
Line.....	4,017	42.5	321	29.8
Total United States.....	9,457	100.0	\$1,076	100.0

Source: U. S. Bureau of the Census, 15th Census of the United States, Census of Distribution, Agricultural Commodity Series, *Distribution of Grain* (Washington, Government Printing Office, 1934), pp. 15-16.

The average country elevator consists principally of a storage place or bins into which the farmers' grain is elevated and from

Bulletin 206, *Farmers' Elevators in North Dakota* (Fargo, February, 1927); Colorado Experiment Station, Bulletin 397, *Operating Practices of Farmers' Cooperative Elevators in Colorado* (Fort Collins, October, 1932); Minnesota Agricultural Experiment Station, Bulletin 251, *Economic Aspects of Local Elevator Organization* (St. Paul, April, 1929); South Dakota Agricultural Experiment Station, Bulletin 282, *Farmers' Elevators in the Spring Wheat Area of South Dakota* (Brookings, December, 1933); and Montana Agricultural Experiment Station, Bulletin No. 226, *Current Problems of Montana Farmers' Elevators* (Bozeman, February, 1930).

which it is later loaded onto freight cars. The average capacity of a local elevator is about 40,000 bushels. The annual volume of business may range from less than 100,000 bushels to more than 1,000,000 bushels. The average is about 250,000 bushels, and

EXHIBIT 10
EXAMPLE OF GRADING STANDARDS FOR GRAIN
Class I—Hard Red Spring Wheat

Maximum limits of							
Grade No.	Mini- mum test weight per bushel, pounds	Damaged ker- nels (wheat and other grains)		Foreign material		Wheats of other classes	
		Total, %	Heat- dam- aged, %	Total, %	Matter except other grains	Total, %	Durum and/or Red Durum, %
1 heavy*†.....	60	2	0.1	1	0.5	5	2
1".....	58	2	0.1	1	0.5	5	2
2".....	57	4	0.2	2	1.0	10	3
3.....	55	7	0.5	3	2.0	10	5
4.....	53	10	1.0	5	3.0	10	10
5.....	50	15	3.0	7	5.0	10	10
Sample grade.....	Sample grade shall include wheat of the subclass Dark North- ern Spring, or Northern Spring, or Red Spring, which does not come within the requirements of any of the grades from No. 1 heavy to No. 5, inclusive; or which contains more than 16% of moisture; or which contains inseparable stones and/or cinders; or which is musty, or sour, or heating, or hot; or which has any commercially objectionable foreign odor except of smut or garlic; or which contains a quantity of smut so great that any one or more of the grade requirements cannot be applied accurately; or which is otherwise of dis- tinctly low quality.						

* Applies to each of the subclasses Dark Northern Spring, Northern Spring, and Red Spring.
† The wheat in grades No. 1 heavy and No. 1 of this class may contain not more than 7%,
and the wheat in grade No. 2 of this class may contain not more than 10% of shrunken and/or
broken kernels of grain and other matter that will pass through a 20-gauge metal sieve with
slotted perforations 0.064 inch wide by 3/4 inch long.
Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *Handbook of
Official Grain Standards of the United States* (Revised June, 1937), U.S.G.S.A., Form No. 90, p. 3.

apparently an elevator cannot be operated profitably on an annual volume of less than 125,000 bushels.

Elevators buy and sell grain by Federal grade standards. These grades are determined by measurements of weight per bushel, damaged kernels, foreign matter, and percentage of other

grains. Such grades are subdivisions of the various classes and subclasses described above.¹ These grades prescribe the minimum test weight per bushel, the amount of foreign material permitted in each grade, and the percentage of other types of grain permitted. The grades for Hard Red Spring Wheat shown in Exhibit 10 indicate the type of specifications laid down for the various grades.

Each elevator operator determines the grade of farmers' deliveries, although if the grain is delivered in carlots the farmer has the option of settling on the basis of the terminal market grade. In order to retain the farmer's patronage and to keep him satisfied there was a tendency in previous years to overgrade.² This method of retaining business was unsound, and many elevators which consistently followed this practice encountered difficulties.

The farmer is usually paid in cash for his grain after it has been weighed, although sometimes final settlement is delayed when there is any question as to the grade of the grain.

The price is always determined by the quotations for grain in the terminal markets, less freight charges to the market, and the elevator's commission and handling charges. When there is only one near-by terminal market, the problem is simpler than when the grain can be shipped to one of several markets. In the latter case the elevator operator must keep a constant check on the various markets and also on the various grains. For example, the elevator may find that Minneapolis is quoting the highest prices for barley, while Cedar Rapids is the best market for oats and Chicago for corn. The producer shipping on consignment must be equally alert. The elevator operator frequently buys on "card" prices, the quotations for his location being sent to him by a market reporting agency to which he subscribes; or he may be supplied with quotations from commission merchants in the terminal market, or from brokers buying grain for mills and processing plants; or he may calculate his own prices from market quotations given over the radio. Line elevators are usually given instructions from the central office regarding prices to be paid and shipments to be made, although sometimes the local manager is given the authority to adjust his bids to the local situation.

¹ See pp. 208, *et seq.*

² North Dakota Agricultural Experiment Station, Bulletin 206, p. 16, and South Dakota Agricultural Experiment Station, Bulletin 282, p. 45.

The price paid the grower also varies with other factors affecting the quality of the grain. Some elevators purchase grain with a special settlement regarding the percentage of foreign matter in the grain. Purchase on this basis is known as the dockage system, the dockage (foreign material) being determined by sample. When the elevator has cleaning equipment, the screenings are returned to the farmer, and he is paid for the amount of cleaned grain. In recent years premiums have been paid by many elevators for wheat of a high protein content. This development reflected the higher prices paid for high protein content wheat by the mills.

There are various ways whereby the local independent elevator manager may sell his grain, but the most important channel is to sell through a commission merchant in the terminal market, to whom the grain is shipped on consignment. The other principal channel is through a grain dealer or some other terminal market buyer who purchases the carload of grain. Actually the commission merchant and the grain dealer may be the same person. The terminal market receiver may accept the grain on a consignment basis, or purchase it outright. Sales may be made *on track* at the local elevator, in which case the buyer pays the freight to the terminal market, or *to arrive* at the terminal market, in which case the local elevator pays the freight. Other possible outlets are through the sale of grain to a representative of mills, or a sale for future delivery to a mill. As another alternative the grain may be stored in the local elevator and an equal amount of futures contracts sold to insure against price fluctuations. For line elevators, shipments of grain are directed from the office and headquarters.

The cooperative elevator has the same choice of markets as the local independent elevator. In a few instances cooperative elevators are organized in a manner similar to the line elevators, sales and purchases being directed by a central organization and profits being pooled. This type of organization was popular in the 1920's but has practically disappeared.¹ Another type of affiliation of the cooperatives was with cooperative terminal sales agencies, which either handled the grain on consignment or purchased it outright. The most important of these, the Farmers

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, *Cooperative Marketing of Agricultural Products*, by Ward M. Fetrow (Washington, February, 1936), pp. 47-49.

National Grain Corporation, which was organized in 1929 as a central agency in the terminal markets for handling the grain of the cooperatives, was dissolved in 1938 after a generally unsatisfactory history.

The consignment method of sale is most frequently used, since the local elevator secures the benefit of an accurate, impartial appraisal as to the grade of the grain shipped. The price is not set until the grain has arrived, has been sampled, and then sold in the terminal market. In this way the buyer is able to examine the grain and to avoid the risk of buying entirely on description. Methods of sale vary with the individual elevator operator; many prefer to sell *on track* or *to arrive* in order to avoid the risk of price fluctuations while the grain is in transit. Particularly during the periods of heavy movement of grain, when the local elevator has large quantities of grain, representing a substantial investment, en route to the terminal market, the operator may sell at least part of his purchases on a *to arrive* basis to reduce his risk. Direct buying by mills or other processors has increased during recent years, and larger quantities of grain are being sold locally to the traveling representatives of these buyers. This increase in direct buying was encouraged during the two years of severe drought when supplies of grain were sharply restricted. Sufficient quantities of grain of the particular grade desired by these processors were not arriving in the terminal markets and it became necessary to send representatives into the grain country to discover where the necessary grades could be purchased.

In a few cases the local elevator stores grain and hedges the purchase by the sale of a futures contract. The limited facilities for storage at harvest make this policy undesirable. In fact, much grain stored by the farmers must be shipped out before it is actually purchased from the farmers. In such a case the elevator manager protects himself on the price by buying futures when the stored grain is sold, and selling an equivalent amount of futures when the grain is finally purchased from the farmer.¹ In the states which are not primarily grain producers this is usually the only time when elevators hedge.²

¹ South Dakota Agricultural Experiment Station, Bulletin 282, p. 53.

² Ohio Agricultural Experiment Station, Bulletin 416, *Economic Aspects of Ohio Farmers' Elevators* (Wooster, December, 1927), p. 48, and Missouri Agricultural Experiment Station, Bulletin 311, *Operating Practices of Missouri Cooperative Elevators* (Columbia, 1932), p. 8.

On the other hand, elevators located at a considerable distance from the terminal markets and selling principally by consignment must hedge to protect themselves during the time when large quantities of grain are in transit to the terminal market.¹ To cover their operations closely under such conditions the local managers compute their long and short position frequently and handle futures operations carefully in order to have adequate protection. Although hedging is necessary and desirable to ensure profitable operation, it seems clear that few elevator managers hedge carefully, some because they do not watch their operations closely enough, others because they deliberately take risks in the hope of speculative profits.²

If the elevator operator ships on consignment and needs to borrow money from the local bank until he receives the proceeds from the sale, he makes out an order bill of lading. This bill of lading is then endorsed, and becomes negotiable. The shipper then draws a demand draft on the consignee, usually amounting to 80% of the value of the grain. When the bill of lading is turned over to the bank, the shipper's account is credited with the amount of the draft. The consignee must, of course, pay the draft before the bill of lading is turned over to him. If the elevator does not need bank financing, a straight bill of lading is sent to the consignee, who pays the consignor when the car is unloaded and final determination of grade has been made.

The other grain handling functions of the local elevators vary with the size of the elevator, and to some extent in different sections of the country. Mixing is done frequently; for example, a small proportion of a lower grade of grain may be added to a higher grade without changing the grade of the larger amount, but resulting in a higher return per bushel for the entire lot. This blending and mixing require skill and a precise knowledge of grades. In other cases, grains of approximately equal grades are mixed to complete a carload, when the chief purpose is to make up a full car rather than to increase the elevator's profit by mixing and blending.

¹ Montana Agricultural Experiment Station, Bulletin No. 226, pp. 30-31; also see North Dakota Agricultural Experiment Station, Technical Bulletin 272, *Hedging Grain by Farmers' Elevators* (Fargo, June, 1933).

² North Dakota Agricultural Experiment Station, Technical Bulletin 272, pp. 10, 33, and 40; South Dakota Agricultural Experiment Station, Bulletin 282, p. 50; and Colorado Experiment Station, Bulletin 397, p. 20.

Some cleaning and drying are done in country elevators, but equipment costs are high and only a portion of the grade factors can be thus affected. When foreign matter is the principal factor in setting the grade, cleaning is sometimes a profitable operation.

Rice.—A large part of the rice crop of the United States is sold through cooperatives. Growers bring samples to the local office of the cooperative, where mill buyers may examine the samples displayed on tables in the salesroom. Sealed bids are submitted by the buyers after they have examined the sample, removed the hulls from a few grains, and noted from the tag the amount available, the location of the rice, and the name of the producer. The highest bid for each lot is then submitted to the grower for acceptance.¹

MARKETING OF GRAIN AT TERMINAL POINTS

The terminal or central markets are the transitory destinations of a large proportion of the grain assembled by the local elevators. This grain is bought and sold in the cash grain terminal markets, some of which also operate futures contract markets for trading in grain.

Cash Grain Markets.—The leading cash wheat markets are Minneapolis, Kansas City, Chicago, Duluth, St. Louis, and Omaha. The principal cash markets for corn are Chicago, St. Louis, Kansas City, Peoria, Omaha, and Indianapolis. The four most important markets for oats are Chicago, Minneapolis, St. Louis, and Milwaukee; and the three most important barley markets are Minneapolis, Duluth, and Buffalo. Chicago, Duluth, and Minneapolis are the principal rye markets. Minneapolis is also the principal market for flaxseed. Other markets known in the trade as terminal or cash grain markets are Portland, San Francisco, Seattle, Los Angeles, and New York.

The representatives receiving grain from country points for sale to buyers in the terminal markets include the grain dealers, the commission merchants, and the sales agencies of cooperative associations. The grain dealer or grain merchant may also buy from others in outside terminal markets to store in his own eleva-

¹ See U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, pp. 99-100, and Malott, Deane W., *Problems in Agricultural Marketing*, "American Rice Growers Cooperative" (New York, McGraw-Hill Book Company, Inc., 1938), pp. 66-69.

tors for later sale to grain processors. Many grain dealers operate elevators in the terminal markets as well as line elevators at country points. The grain dealer may also operate as a commission merchant, either for country elevators to which he has earlier made advances, or for other elevators that consign cars to him. The cooperative terminal sales agencies, of which there were 26 in 1935, formerly operated solely on a consignment basis and did not actually buy wheat from their members. During recent years the consignment business has declined as the cooperatives have begun to buy wheat.

The buyers in the terminal markets include the flour mills, corn processors, poultry and stock feed manufacturers, maltsters, and distilleries, in addition to the grain dealers. Grain dealers operate their own elevators, and mix and condition grains to suit their own needs for later sale and shipment, principally to the East. Public elevators store grain for other buyers, either by storing together all the grain of a certain grade, or by storing in separate bins the grain which a buyer wishes to keep segregated because of some desirable quality, such as protein content, that is not covered in the official standards. The amount of grain stored for the account of others is usually insignificant. Another functionary in the market is the grain broker, who serves to bring the seller and buyer together but does not deal in grain on his own account.

The trading in cash grain usually takes place in the market's grain exchange. In Chicago, for example, long rows of tables extend down one side of the trading floor of the Board of Trade. The tables are usually covered with paper bags containing samples of grain, each bag representing a carload of grain located somewhere within the Chicago switching district. The samples are taken from the cars¹ by representatives² of the Illinois State Grain Inspection Department and graded by that department; the grain is described by the class, subclass, and grade as prescribed by the official United States standards.

¹ The sample is taken by means of a "trier," which is inserted in the car of grain and secures samples at 6-inch intervals to a depth of about 5 feet. The inspectors at the laboratory are Federally licensed, and their decisions may be appealed to the office of the Federal Grain Supervision, to the Bureau of Review established by the Chief of the Bureau of Agricultural Economics, or, finally, to the Secretary of Agriculture.

² Licensed by the Secretary of Agriculture, under the United States Grain Standards Act.

To receive the sample at his table, the dealer must have first received the bill of lading from the country elevator if the car was handled on a consignment basis, or the dealer must have paid the elevator's draft and received the bill of lading from the bank if the car was purchased on an *on track* or *to arrive* basis.

If the dealer owns the car he is free to negotiate on whatever price level seems appropriate, and sometimes he is authorized to use his own judgment in the same way when the car is received on a consignment basis. At other times the consignor may set a minimum price or may ask to be notified as to the price offered for his grain.

The sale is made after the dealer has canvassed the buyers and is certain that he has received the highest possible bid for the grain. The buyers have examined the sample, formed their own estimate of the grade and value, and have made their bids accordingly.

The dealer then notifies the quotation department of the Board of Trade of all the details of the transaction. The buyer confirms the sale by a written order which gives instructions as to delivery. If the car is to be delivered to an elevator in the Chicago district, it is unloaded at the elevator and then weighed under the supervision of a deputy of the Board of Trade's weighing department, who makes out an official certificate of the amount of grain in the car. Settlement is made on the basis of this official weight. Water and rail freights inbound and outbound are usually paid for on the basis of these weights.

For the services performed in such transactions, the receiver earns a commission which is set by the rules of the Board of Trade. In the case of all grains except oats, this commission, paid by nonmembers, amounts to 1% of the value of the carload, or a minimum of 1 cent a bushel.¹ Charges are slightly lower to members.

The public elevators in the terminal markets store grain according to the grades specified by the United States standards. Warehouse receipts are issued on the basis of these types and grades. The grain delivered will probably not be the precise grain stored by the owner, of course, since grain of like grade is mixed, but the owner is certain to receive grain of the grade stated

¹ Chicago Board of Trade, *80th Annual Report*, Rules—Brokerage & Commissions, Sections 230, 231, and 232 (Chicago, 1938), pp. 289-292.

on the receipt. These elevators are owned by elevator or warehouse operators, by railroads, by grain dealers, and by the cooperatives. In Chicago, which is the only contract market where the warehouses are licensed by the Federal Warehouse Administration, a certain section of the public elevator is usually operated as a private elevator, since this restriction is one imposed by the state license. Special bins are used for storage of grain either offgrade or possessing some particular quality, or for storing the grain owned by the elevator operator who plans to clean or otherwise condition the grain to improve its grade.¹

EXHIBIT 11
VOLUME AND ESTIMATED VALUE OF FUTURES TRADING IN COMMODITIES
UNDER THE JURISDICTION OF THE COMMODITY EXCHANGE
ADMINISTRATION, AVERAGE, 1926-1927 TO 1935-1936*

Commodity	Volume of futures trading	Estimated value of futures trading	
		Dollars	%
Wheat.....	11,352,161,000 bushels	\$11,917,101,000	46.88
Corn.....	4,114,909,000 bushels	3,046,267,000	11.98
Oats.....	919,592,000 bushels	363,093,000	1.43
Rye.....	447,972,000 bushels	344,476,000	1.36
Barley.....	69,902,000 bushels	42,854,000	0.17
Flaxseed.....	33,780,000 bushels	70,423,000	0.28
Grain sorghums.....			
Cotton.....	130,878,000 bales†	9,355,000,000	36.80
Rice.....			
Millfeeds.....	578,000 tons	10,380,000	0.04
Butter.....	464,000,000 pounds	140,000,000	0.55
Eggs.....	515,000,000 dozen	129,000,000	0.51
Potatoes.....	1,022,000 bushels	1,098,000	0.004
Total.....		\$25,419,692,000	100.00

* Less than 10 years for some of the minor commodities.
† Estimated.
Source: U. S. Department of Agriculture, Commodity Exchange Administration, CEA-14, *Trading in Commodity Futures* (Washington, no date), Table 2, p. 10.

Grain Futures Markets.—Futures markets for wheat, corn, oats, rye, barley, and flaxseed are established in various cities. The estimated value of futures trading in these commodities is shown in Exhibit 11. In 1929 it was estimated that the commodities other than grains and cotton accounted for only 5.5% of the total

¹ Some of the information in this section has been summarized from material edited by Deane W. Malott for use in the Grain Exchange Institute, sponsored by the Association of Grain Commission Merchants in the Chicago market.

futures trading in all commodities.¹ Cotton trading is less important than wheat from the standpoint of volume, and the grains constitute the most important group of the many raw materials traded in on futures exchanges.

The Chicago Board of Trade, which is by far the most important futures market for grain, for the year ending June, 1937, accounted for 88.3% of the total volume of futures trading in grain on all markets. The other markets with a volume of more than 1% were the Kansas City Board of Trade with 5.7%, the Minneapolis Chamber of Commerce with 4.4%, and the Chicago Open Board of Trade² with 1.3%.³

As may be seen from Exhibit 11, wheat is not only the most important grain, but from the standpoint of value of contracts the most important commodity which is traded in on the futures exchanges. Wheat futures are traded in on the four exchanges mentioned in the preceding paragraph and on the Duluth Board of Trade, the Milwaukee Grain and Stock Exchange, the New York Produce Exchange, the Portland Grain Exchange, the St. Louis Merchants' Exchange, and the Seattle Grain Exchange. There are futures markets for corn in Chicago, Kansas City, Milwaukee, St. Louis, and Minneapolis. Oats futures are traded in at Chicago, Minneapolis, Milwaukee, Kansas City, New York, and St. Louis. There are only four futures markets for rye: in Chicago, Duluth, Milwaukee, and Minneapolis. Six futures markets have been established for futures trading in barley: Minneapolis, Chicago, Duluth, Milwaukee, San Francisco, and Los Angeles. Duluth and Minneapolis are the only two futures markets for flaxseed.

The unit of trading on the Chicago Board of Trade is 5,000 bushels.⁴ "Job lots" of less than 5,000 bushels may be purchased and sold through brokers specializing in this type of business, but there are no ticker quotations for trading in these lots. The unit of trading for job lots is 1,000 bushels of wheat, corn, rye, and barley, and 2,000 bushels of oats.

¹ Hoffman, G. Wright, *Future Trading* (Philadelphia, University of Pennsylvania Press, 1932), p. 10.

² The Chicago Open Board of Trade is a market where the unit of trading is small and where no cash grain transactions take place. It is primarily a speculator's market.

³ U. S. Department of Agriculture, Commodity Exchange Administration, CEA-14, p. 16.

⁴ Except in the case of soybeans, where the unit is 1,000 bushels.

Futures contracts are bought and sold through futures commission merchants, who usually turn over orders to floor brokers for execution. The commission merchants solicit or accept orders for futures trading, and floor brokers are the individuals who actually buy and sell on the floor of the exchange. These firms and individuals trade for their own accounts as well as for their customers.

Approximately 50% of the open contracts in the grain futures markets are hedging transactions, and the other 50% represent speculative transactions.¹ In a study of the occupations of the persons having open contracts in wheat or corn on the Chicago Board of Trade on September 29, 1934, only four groups had more than 1,000 persons; these were, in order, farmers, grain companies and elevators, commission houses, and housewives.²

The futures markets have been the subject of criticism since their inception, and the practice of hedging has appeared to be one of the most abstruse problems of business. Complexity of business operations frequently results in misconceptions by those who observe the complexity rather than the function performed, and misconceptions create unjustified criticisms. The business function performed by the futures exchanges is very important in terms of dollars and cents to the firms using these exchanges, and unwarranted allegations as to the element of gambling in these operations have failed to take into account the beneficial service performed by the exchanges in providing a marketing mechanism.

Futures markets were evolved to meet urgent needs of businessmen to perform their functions economically and efficiently. In the case of grains, contracts were made some days or months ahead, on the basis of the expected arrivals of boats. These contracts were used frequently during the Civil War, and trading increased. Orders for wheat were received in varying proportions and at different prices, and businessmen needed some assurance of both supply and quality of grain to be delivered at some time in the future. Liverpool merchants were in the same position in regard to arrivals of cotton from America, and a similar *to arrive* contract was developed in that market. These contracts were the predecessors of the futures contracts, and markets were estab-

¹ U. S. Department of Agriculture, Commodity Exchange Administration, CEA-14, p. 26.

² *Ibid.*, p. 23.

lished to permit the purchase and sale of rights of ownership of a certain commodity of specific grade at some future time.

The futures markets are effective mechanisms for insuring a certain proportion of the value of a particular commodity owned by a businessman who is either processing or storing that commodity and who cannot afford to take the risk of wide fluctuations in price during the period in which he has possession. For this reason hedging has been called "price insurance," but this is somewhat of a misnomer since it is extremely unlikely that a hedge can ever provide 100% protection, as will be explained below. However, hedging through the use of futures markets does protect a substantial proportion of the investment, and consequently the size of potential inventory losses is reduced. This is particularly important for firms such as the cash grain firms and the cotton shippers, since these firms typically operate on a very narrow margin of profit. When such a situation exists, the entire capital of a firm might be wiped out by price changes reflecting causes outside the control of the businessman and not directly related to his operations. By hedging he attempts to reduce the risk to the area or differential which represents the value of the services he performs in moving the commodity to its final destination. This price protection also facilitates financing, inasmuch as the lender's risk is reduced when the possible losses from inventory price fluctuation are minimized.

In its simplest form, a hedge is a transaction whereby a futures contract is used in an amount equivalent to the actual commodity, with the expectation that during the time of the hedge the relationship between the cash price and the futures price will remain approximately the same, and losses from a decline in the cash price of the commodity will be offset by gains in the transactions in futures, or vice versa. For example, a miller buys 5,000 bushels of wheat at \$1 per bushel, and therefore invests \$5,000 in inventory. Since he has made no sale of the flour to be made from this wheat, a decline in price of wheat would wipe out the very narrow margin of profit upon which he operates. Consequently, he *sells* a contract for 5,000 bushels of wheat on the futures market at, say, \$1.10¹ per bushel. Two months later he sells flour to a

¹ For simplicity, it can be stated that this spread of 10 cents between the cash price and futures price represents the cost of storage, insurance, and interest required to hold a certain amount of wheat until the contract matures and the wheat is delivered at a later date. Obviously this is an ideal situation. In actuality, the spread varies in amount for a variety of reasons.

customer on the basis of a cash price of 90 cents a bushel for wheat, or the equivalent of an inventory value of \$4,500. But assuming that the spread between cash and futures price has remained the same, the price for futures has also declined 10 cents, and he can therefore buy a futures contract at \$1 per bushel, or \$5,000, whereas two months earlier he had sold this contract at a price of \$1.10 per bushel, or \$5,500. Thus the gain of \$500 from the futures transaction offsets the loss of \$500 from the cash transaction. This illustration is obviously oversimplified, since differentials between cash and futures prices do not always remain the same, but the amplitude of fluctuations of these differentials is far less than the fluctuations in the full price, and a substantial proportion of the value of the inventory is thus protected.

The question immediately arises as to who takes the risk if the miller does not. It may very well be that in the sale of a futures contract referred to above another miller may have purchased it to cover a sale of flour for which he had not yet secured an equivalent amount of wheat, or an elevator may have purchased it to cover the sale of wheat not yet secured to a mill for delivery at some future time. As mentioned above, a substantial speculative interest exists in the grain markets, and a speculator may have purchased the contract expecting wheat prices to rise over the period of time covered by the contract. Thus, the risk is transferred either to a speculator or to other businessmen who cannot protect their inventories, since the price of their finished product does not fluctuate in accord with variations in the prices of the raw commodity. For example, the purchaser of flour may be a baker, and this baker in effect loses because he purchased flour and the price of wheat declined before all this flour could be made into bread. But the price of wheat used is only a small proportion of the total price for bread, and bread prices are related to the price of wheat only in very broad swings. Thus, the loss to the baker is much less proportionately than it would have been to the miller. In other words, a price decline which would have been disastrous to the miller is a normal risk of doing business for the baker.

There are a number of qualifications which a commodity must meet before it can be traded in on an organized futures exchange. In the first place, it must be sufficiently uniform so that it can be readily and precisely graded and can therefore be bought and

sold by description. It must also be relatively nonperishable. Furthermore, a large number of buyers and sellers and relatively large quantities of the commodity are required to provide an open market and one which cannot be cornered or manipulated by one individual or group of individuals. Usually the commodity is produced seasonally and processed continuously, thus providing a necessity for carrying inventories for substantial periods.

In summary, it appears that futures markets perform an essential business function and contribute to the economic progress of the groups of processors and middlemen making use of these markets as a part of their business operations. The relationship between cash prices and futures prices and the effect of one on the other is too large a subject to enter into in this discussion, since much statistical research must be done to substantiate any statements made on this point. It is clear, however, that the use made of the futures market justifies its existence, and in performing a business function it is likely that futures prices are affected by the same factors as cash prices, and that in the long run prices for both are determined by the future outlook for the commodity, including many and various factors of supply and demand.

THE PROCESSING OF GRAINS

Wheat.—The flour-milling industry is comparable to the cotton-textile industry in the wide shifts which have taken place in the geographical center of production. Shifts in producing areas, changes in types of wheat produced, freight rates, and changing consumption have played a part in the migration of the wheat-processing industry.

An interesting aspect of the flour-milling industry is the fact that today there are actually in use examples of grinding which represent every step of technological progress in the industry.¹ There are crude grain-crushing devices such as the saddle stone, the quern, the mortar and pestle, all of which are used to grind wheat manually. There are examples of water mills, tide mills, windmills, mills for which power is produced by horses or cattle, mills powered by steam and by electricity, mills using stones, and mills using rollers.

¹ Edgar, W. C., *The Story of a Grain of Wheat* (New York, D. Appleton-Century Company, Inc., 1925), p. 148.

During the early part of the nineteenth century, Philadelphia, Baltimore, and Richmond were in turn the most important milling centers. The development of agriculture in the West and the increase in acreage planted in wheat then caused a westward shift in the milling industry. By 1850 Rochester, New York, which had developed as a milling center shortly after Baltimore and Richmond, was the leading flour-milling center in the country, but this center lost its supremacy as the westward trend of wheat production continued. The opening of a vast wheat territory in the Mississippi and Missouri valleys created a new source of supply of wheat. This region produced soft winter wheat which at the time was thought to produce the finest flour. To process this wheat a milling industry grew up in St. Louis, which by 1860 ranked with Rochester as the leading flour-manufacturing center in the United States. The milling industry in Cincinnati also expanded. These milling centers in the West were first developed principally to meet local needs, but later they shipped flour to compete with that produced in eastern mills. The mills of Cincinnati and St. Louis, with cheap water transportation available and grinding western red wheat rather than the white wheat grown in the Genesee Valley, soon became dominant and surpassed the production of eastern mills.¹

The leadership of St. Louis and Cincinnati was not long-lived; the Minneapolis milling industry was developing, and was destined soon to become the most important milling center in the country. A large number of settlers were establishing homes in Minnesota after 1850, and the population spread into North and South Dakota. In Minneapolis the Falls of St. Anthony provided excellent water power; in 1870 several mills were established there.

Soft winter wheat could not be grown satisfactorily in Minnesota, and the spring wheat was hard. The great pressure and high speed required to grind this wheat generated so much heat that the flour became discolored and was unacceptable in the market. Country millers were grinding the wheat slowly and using several processes of purifying which resulted in satisfactory flour, but the purifying was expensive.

George Chase Christian, a representative of an eastern flour commission house, and Governor Washburn of Wisconsin became

¹ Kuhlmann, C. B., *The Development of the Flour Milling Industry in the United States* (Boston, Houghton Mifflin Company, 1929), pp. 102-103.

partners to operate a Minneapolis mill owned by Washburn and formerly leased to others. With the assistance of the head miller and engineer a purifying method adapted from a French invention was developed. This method revolutionized the industry and created a market for northwestern wheat and flour.¹ This "middlings purifier" permitted the separation of the flour and the middlings, which were particles to which the bran or covering of the wheat berry still adhered. The brittle husk of the hard spring wheat could thus be removed from the flour, leaving a pure white product.

The first complete automatic roller was introduced in the Washburn mill in 1878.² The rollers were made of chilled and corrugated iron and permitted multiple grinding at a reduced speed and pressure. With the use of the purifier and the iron rollers, hard spring wheat could be processed economically, and the flour was in great demand.³ As a consequence, Minneapolis soon became the leading milling center, not only of this country but of the world.

The introduction of the purifier and roller mill process resulted in a substantial increase in size of mills. From an average daily capacity of 242 barrels in 1876, Minneapolis mills had grown until they were handling a daily average of 578 barrels in 1880, and 1,837 barrels in 1890.⁴ This increase in productive capacity, combined with reduced costs of operation in the large mills, resulted in the elimination of many small mills. As a consequence, the flour-milling industry became more concentrated geographically.

Hard winter wheat production was increasing in Kansas and the Southwest during this period, and a flour-milling industry began to develop there. Kansas hard winter wheat was used in the northwestern milling industry for mixing with the hard spring wheat produced in that territory. By 1925 the production of the southwestern mills exceeded that of the northwestern mills, as shown in Exhibit 12. The southwestern mills were concentrated in Kansas City, but there were other important milling centers in Salina, Atchison, Hutchinson, Wichita, and Enid, Oklahoma.

¹ Clark, V. S., *History of Manufactures in the United States* (Washington, The Carnegie Institution, 1928), Vol. II, p. 504.

² Edgar, *op. cit.*, p. 165.

³ Kuhlmann, *op. cit.*, p. 119.

⁴ *Ibid.*, p. 128.

Kansas City, as a milling center, never reached first rank in the industry, for Buffalo had increased production at about the same pace until, in 1929-1930, Buffalo surpassed Minneapolis as the leading flour-milling center (see Exhibit 13). Buffalo developed as a result of the transfer of milling capital and talent from Minneapolis. By 1930 Minneapolis millers owned and operated over 85% of the capacity of all Buffalo mills.¹

EXHIBIT 12
FLOUR MILLED IN SOUTHWEST, NORTHWEST, AND NEW YORK STATE,
1899-1930
(In barrels)

Year	Southwest	Northwest	New York State
1899	8,723,117	27,150,469	5,434,827
1904	12,261,672	30,200,000	5,678,743
1909	17,786,333	31,729,677*	6,666,696
1914	20,281,748	30,923,249*	8,492,489
1919	27,836,782	31,811,814*	9,026,497
1921	24,051,342*	28,727,803*	8,373,463
1923	27,133,401*	28,030,520*	8,949,095
1925	29,029,724*	26,745,994*	12,523,391
1927	32,731,341*	26,625,200*	12,306,489
1928	29,394,124*	24,054,725*	12,515,516
1929	32,197,264*	21,922,925*	13,173,710
1930	31,146,693*	20,866,164*	13,334,773

* Year beginning July 1.

Source: University of Minnesota, Studies in Economics and Business, No. 5, p. 71.

The reasons for these dramatic shifts of the center of flour-milling production from East to West and back again are numerous and complicated. Unlike the cotton-textile industry, which moved closer to the center of production of cotton and remained there, the flour-milling industry followed some of the important shifts in wheat production and then departed. Nevertheless, changes and shifts in wheat production and in flour milling were interdependent. The decline in flour production in the Northwest was partly brought about by changes in wheat production in that area. The quality of the northwestern wheat had declined when varieties with poor milling qualities were introduced. An additional factor in the decline in quality of northwestern wheat was the increased number of weeds harvested with this wheat. After 1900 additional acreage had been planted to durum wheat,

¹ University of Minnesota, Studies in Economics and Business, No. 5, p. 16.

which replaced hard spring wheat. Furthermore, the susceptibility of spring wheat to diseases such as smut and rust had reduced yields and production in this area.

The increased production of winter wheat in the Southwest encouraged the development of the milling industry in this section. As in most migrations of industry, establishment of plants in new areas also meant the construction of mills which could incorporate the latest developments and install the newest and most efficient machinery to give them an additional competitive advantage over the older mills.

EXHIBIT 13
PRODUCTION OF WHEAT FLOUR, SELECTED CITIES, 1902-1938
(In thousands of barrels)

Year	Buffalo	Kansas City	Minneapolis
1902	966	1,298	16,260
1905	2,465	2,053	14,366
1910	3,765	2,226	15,376
1915	6,590	2,865	18,089
1920	5,243	3,597	15,003
1925	9,463	5,411	12,060
1926	9,672	6,179	11,793
1927	10,032	7,382	11,540
1928	10,060	7,565	12,244
1929	10,133	7,928	10,797
1930	12,270	7,775	10,797
1931	11,076	7,537	9,122
1932	9,789	7,082	7,227
1933	9,781	6,091	7,283
1934	9,625	5,857	7,082
1935	9,635	6,070	6,636
1936	10,425	6,203	6,453
1937	10,252	7,332	5,681
1938	10,200	7,480	5,737

Source: (1902-1910) *The Miller's Almanack*, 1914-1915, pp. 140, 154, 180; (1915-1938) *The Northwestern Miller*, April 26, 1939, Almanack Section, Section 2, p. 26.

Freight rates have played as important a part in the shift in the flour-milling industry as in the meat-packing industry. The favorable location of Buffalo, which permitted lake transportation from the wheat-producing regions of the Northwest for a considerable portion of the distance to the eastern markets, encouraged the establishment of mills in Buffalo. In 1920, milling-in-transit privileges¹ which had encouraged the development of

¹ Milling-in-transit privileges permitted the processing of wheat to be performed, without additional charges, at some place other than the point of origin or destina-

Minneapolis were withdrawn. Proportional rates, which gave some of the same benefits, were substituted, and later part of the milling-in-transit privileges were restored, but some damage had already been done, and this withdrawal of privilege had affected the Minneapolis milling industry adversely.¹ Again, in 1935, milling-in-transit privileges as applied to shipments of grain from Duluth and the Southwest were withdrawn. After protests by Minneapolis millers, an emergency rate was established, but southwestern millers objected and the emergency ruling was withdrawn.²

Buffalo was also favored because of its cheap power. It has been estimated that power costs for mills in Buffalo were only two-thirds of similar costs for Minneapolis mills.³ This item is a small one, the differential amounting to not more than $2\frac{1}{2}$ cents per barrel of flour, and would not be sufficient, of course, to justify a large and significant shift in the industry.

Another favorable factor in the development of the milling industry in Buffalo was the fact that Canadian wheat could be milled in bond for export. Since Buffalo is on a direct line between the Canadian wheat regions and the export markets, this fact was of some importance. As a consequence, milling for export in Minneapolis declined in the 1920's and Buffalo's export business increased. With the decline in export markets this advantage has diminished, but the shift in milling capacity had already occurred.

Some of the advantages which benefited the Southwest, in addition to its proximity both to the new wheat-producing areas and to cattle regions which provided a near-by outlet for mill-feeds, were the lower costs of winter wheat, as compared with spring wheat, and the higher flour yield from winter wheat, as compared with spring wheat. On the other hand, spring wheat typically has a higher protein content than winter wheat.

*The Processing of Wheat.*⁴—The wheat kernel is composed of three principal parts: the bran or outer coat of the kernel; the

tion of the shipment. In other words, the through rate was applied to the shipment rather than the total of the two or more local rates.

¹ University of Minnesota, Studies in Economics, No. 5, p. 55.

² Malott, *op. cit.*, pp. 289-298.

³ University of Minnesota, Studies in Economics, No. 5, p. 47.

⁴ This section has been condensed from material edited by Deane W. Malott for use in the Grain Exchange Institute, sponsored by the Association of Grain Commission Merchants in the Chicago market.

endosperm, composed of gluten and starch produced later as flour; and the germ, or embryo wheat plant. In flour milling the endosperm is ground and removed from the other constituents.

As in most agricultural industries, the first problem of the processor is the selection of the proper raw materials. A miller produces two types of flour, bread flour and cake flour. The bread flours are ground principally from hard red spring and hard red winter wheat, whereas cake or pastry flours are ground from soft red winter wheat. Bread flours are subdivided into baker's flour and family flours. Baker's flour usually must be "strong," in other words, possess a high gluten content. The two important proteins in wheat which absorb from two to three times their weight in water are known together as gluten. Family flours are not so strong, nor do they usually have so high a protein content. Cake or pastry flours usually have an even lower protein content.

The miller must consider both the level and the uniformity of the quality of his flour when he is purchasing wheat. His customers expect flour which produces consistent results, and the miller must be certain that he buys wheat which will permit him to produce flours with the same percentage of gluten, of protein, and of ash content.

When the wheat is purchased, the miller sells an equivalent amount of futures contracts unless he has a forward commitment for the delivery of flour. Ordinarily, flour millers hedge much more meticulously than cotton-textile mills, since flour prices are more directly related to the price of wheat than the prices of cotton fabrics to raw cotton. As a consequence, the flour miller is more assured than the treasurer of the cotton mill that a higher proportion of the price will be covered in the hedge. In addition, the cost of wheat represents a higher proportion of the cost of the finished product than does the price of raw cotton in the price of the finished fabric. The "basis" or differential between the cash grain prices and futures prices cannot be hedged, for the same reason that a cotton shipper can hedge his position but not the basis.¹

When the wheat arrives at the mill its protein content is checked by chemical analysis, and after a rough cleaning process

¹ Hedging by a flour miller is very similar to the hedging operations of the cotton shipper. The description of the techniques of hedging in cotton are applicable here, and reference to pages 155 and 156 will give a clearer picture of the problem.

it is placed in a separate bin or in a bin with other wheat of precisely the same grade and protein content. Before grinding, the wheat is mixed with other wheat as may be required to produce the proper quality of flour. The mixing is usually done by mechanical percentage feeders, which draw the proper proportion of each type of wheat from its bin and deliver it to the cleaning machinery.

Wheat must be cleaned of all foreign matter, of chaff, straw, seeds, dust, smut balls, and garlic bulblets. After this cleaning, a small amount of water is added to the wheat, and the mixture is allowed to stand for several hours. This step, which is known as "tempering," results in a toughening of the bran coat. Without tempering, the brittle coat would shatter into small fragments and be difficult to separate from the flour. Tempering is a delicate process, since too much water or too long tempering will affect the milling qualities of the floury center of the kernel, and too short tempering or too little water will leave the bran too brittle.

After tempering, the wheat is fed into the first series of rollers, which perform the grinding operation. The rollers are corrugated iron, rotating toward each other, one revolving at more than twice the speed of the other. The first rollers only crack the wheat, since they are placed relatively far apart. The next set of rollers is closer together, the following set being even closer, and the space is narrowed until the last of the five or six sets of rollers is reached. After each "break," or set of rollers, the cracked and broken wheat is "bolted," in other words, sifted through a series of successively finer sieves whereby some flour is obtained from each break. The material which does not pass through the sieves is returned to the next set of break rolls for further grinding.

These processes produce three general groups of products: coarse fragments which are ground again and sifted until they become bran; the much finer particles which pass through the sieves and are flour; and middlings, which are the intermediate size between the first two groups. Middlings are reground, some flour is produced, and the remainder is ground to a satisfactory size for use as feeds. The flour sieves are usually made of silk in varying sizes of mesh, depending on the size of the particles to be recovered from that particular operation.

After the bolting, flour is graded and blended to produce the particular quality of flour required for the brands of the mills. The flour is then bleached and packed.

Three types of flour are generally produced: straight, patent, and clear. A straight flour, called a 100% flour, is the product of the first series of boltings with only the bran and middlings or feed grades removed. After further bolting, the finer particles are called "patent" and the remainder called "clear." In the trade, patents are designated by percentages such as 70% patent or 80% patent, which means the best 70% or 80% of the flour recovered from the 100% flour. For white bread most bakers use an 80% patent flour.

Semolina flour is made from durum wheat and, as previously mentioned, is used to prepare macaroni, spaghetti, and similar products.

The most important company processing wheat is *General Mills, Inc.*, the corporate descendant of the original Washburn mill of Minneapolis. General Mills was incorporated in 1928, when it acquired the assets of the Washburn-Crosby Company along with other mills. The company has flour mills in every important wheat region in the country, where it produces 21 brands of flour as well as pancake flour, breakfast cereals, and commercial feeds.

The *Pillsbury Flour Mills, Inc.*, is the second largest group of mills in the country. The mills of this company were concentrated in Minneapolis until the 1920's. With the decline in importance of that city as a flour-milling center, this company invested in mills in Illinois, Kansas, and in Buffalo. During 1932-1933 the company dismantled three mills in Minneapolis.

The third most important group is the *Standard Milling Company*, a subsidiary of Hecker Products Corporation. This group operates mills in Buffalo, Milwaukee, Minneapolis, Kansas City, and the Duluth-Superior district. Its family flours are in strong demand in certain sections of the country, although its greatest volume of business is done with bakers and macaroni manufacturers.

Milling interests have been organized for many years, and the trade association of this group is the Millers' National Federation. One of the principal purposes of this organization has been to

standardize the quotations of flour mills as to terms of sale, and to prevent cutthroat competition and a chaotic price structure.

As a result of some of its activities, the flour-milling industry was the subject of an investigation by the Federal Trade Commission.¹ This investigation followed in part the lines of a preceding inquiry which was an outgrowth of the food investigation made shortly after the World War.² The principal findings of these reports, apart from the methods used to disseminate price information among members of the Millers' National Federation, were the increase in size of mills, the decline in number of mills, and the increased size of combinations in the bakery industry.

*Corn.*³—Corn is processed by two different methods, wet-milling and dry-milling, depending on the use to which the processed corn will be put. Products from the wet-milling process include oil, starch, syrup, sugar, and feeds. Dry-milling produces corn meal, grits, hominy, and breakfast foods.

In the wet-milling process, the first step is the separation of the corn into its five constituents: solubles, germ, hull or fiber, starch, and gluten. The corn kernel is similar to the wheat kernel in its three principal parts: the protective covering called the hull; the endosperm, which is a mixture of starch and gluten; and the germ, which contains oil. To facilitate the separation of these parts in the milling process, the corn is soaked in tanks, called steeps, for thirty to forty hours. These steeps have a capacity of from 2,000 to 2,600 bushels of corn. Warm water, dosed with a small amount of sulphur to prevent fermentation, is circulated in the steeps. After the steeping process is completed and the corn softened for milling, it is ground in attrition mills. In this step the corn kernels are torn to pieces, although the germ is uninjured.

The disintegrated material is then passed to the germ separators, deep tanks which are kept full of water. The germs rise

¹ U. S. Federal Trade Commission, *Competition and Profits in Bread and Flour*, Senate Document No. 98, Seventieth Congress, First Session (Washington, Government Printing Office, 1928).

² U. S. Federal Trade Commission, *Commercial Wheat Flour Milling* (Washington, Government Printing Office, 1920). Also, see U. S. Federal Trade Commission, *Wheat Flour Milling Industry*, Senate Document No. 130, Sixty-eighth Congress, First Session (Washington, Government Printing Office, 1924). The specific investigation of the flour-milling industry was reported in U. S. Federal Trade Commission, *Competitive Conditions in Flour Milling* (Washington, Government Printing Office, 1926).

³ Material in this section is condensed from the chapters on corn processing edited for the Grain Exchange Institute by Deane W. Malott.

to the surface, at which time they are taken off one end of the germ separator and sent to the oil expellers. Fine particles of starch convert the water to starch milk, and the heavy portions of the corn settle to the bottom. The starch milk and the particles of corn are drawn off from the bottom of the germ separators at the same time that the germs are flowing out of the top.

In the production of corn oil, the germs are passed through squeezers to remove the water and are then dried in cylindrical revolving dryers. Next, the germs are crushed and heated, and the oil is extracted by oil expellers similar to those used in the extraction of oil from cottonseed. The corn oil meal or cake which is left as a residue is either sold separately or mixed with other by-products for sale as animal feed. The crude oil coming from the expellers is filtered and is used in this state for soap making, varnish, and paint. When the oil is refined further and the gummy matter and fatty acids removed, it is used as salad and cooking oil. Some corn oil is used in the preparation of sizing in the textile industries. The glycerin extracted from the oil is used for explosives.

The disintegrated corn drawn off from the bottom of the germ separators is ground on stone mills which separate the starch and gluten from the hulls. The mixture is bolted to permit the fine particles of starch and gluten to pass through the silk, leaving the hulls, which are used for feeds.

The gluten and starch are separated by running a mixture of starch, gluten, and water through long shallow troughs. The gluten remains in suspension because of its lighter specific gravity, and the starch is deposited on the bottom of the troughs. After a layer of starch several inches deep has been formed, the flow of liquid is cut off and the starch is shoveled or sluiced off.

To produce edible starch, water must be added and the mixture redeposited on starch runs or put through filter presses. The starch is then dried in kilns for a day or more, milled and ground, and sifted through silk in a manner similar to that of flour bolting.

Inedible starch is used in laundries, textile mills, in the manufacture of paper and adhesives, and for fillers for cosmetics. For these uses the starch is steam-cooked under pressure, and small amounts of acid, later neutralized, are added.

Corn syrup is produced from pure starch in converters where the starch is heated under pressure after a small amount of acid

is added. The syrup is then purified in centrifugal machines and filters. The syrup is used in the manufacture of candies, jellies, ice cream, bakery products, and, with some flavoring added, as a table syrup. Adhesives such as Dextrine or British gum are made by roasting dry starch with a small amount of acid.

Other products of corn include tanners' sugar, cerelose or bread sugar, and pure dextrose.

A bushel of shelled corn usually contains 17% moisture when it is put into the steeps. Of the 56 pounds, then, the dry substance amounts to 46.48 pounds, of which 98.5% is recovered in the wet-milling process. The oil recovered from a bushel of corn weighs 1.64 pounds and the starch, 30.44 pounds. The starch, of course, is the product from which the corn sugars and syrups are manufactured. The derivatives of corn, other than oil and starch, are used as feeds.

Relatively few companies are engaged in the production of corn products by the wet-milling process, of which the most important is the *Corn Products Refining Company*. This company's principal plant is at Argo, Illinois, although it has additional plants both in this country and abroad. Other companies include the *American Maize Products Company*, *E. A. Staley Manufacturing Company*, *Union Starch Company*, and *Penick and Ford, Inc.*

Larger quantities of corn are utilized in dry-process milling than in wet-process milling. From 1924 to 1931 an annual average of approximately 115,000,000 bushels of corn was handled by the dry-milling process to produce mixed feeds, breakfast foods, and corn meal. During the same period an annual average of 80,000,000 bushels of corn was used by companies employing the wet-milling process.¹

All the corn ground by the dry process is used for either animal or human food. The process is similar to flour milling; the grain is first moistened to soften the hull, then crushed by corrugated rollers and later sifted to remove the coarse parts of the hull and the germ.

The color of the corn is important, particularly for the products made from white corn. These products include pearl hominy,

¹ Cromwell, R. O., *Utilization of Wheat, Corn, and Oats in the United States*, Sixth Annual Series, Lectures on Grain and Its Marketing, Association of Grain Commission Merchants (Chicago Board of Trade), p. 3.

hominy grits, granulated corn meal, and bolted corn meal. The products from yellow corn include granulated corn meal, bolted corn meal, and samp, from which corn flakes for breakfast foods are made.

Consumption of dry-milling process corn products has been declining for many years. Changing dietary habits, decline in use of corn meal, and the decline in favor of corn meal mush have decreased the use of these products. There are a number of small mills, particularly in the South, grinding corn meal and feeds. The larger companies include the *Kellogg Company*, *Quaker Oats Company*, and *General Foods Corporation*.

Substantial quantities of corn are also used in the manufacture of distilled and fermented liquors. In the year ending June 30, 1937, some 32,698,000 bushels of corn were used in the distillation of spirits and 423,000,000 pounds of corn and corn products in the manufacture of fermented liquors.¹

Rye.—Rye is another grain used in large quantities in the production of distilled spirits. In 1937 a total of 11,551,000 bushels of rye were used for this purpose. Also, rye to produce flour is milled in a manner similar to the production of wheat flour.

Barley.—In the form of malt, barley is used in large quantities in the production of distilled and fermented liquors. In malting, the raw starches in the kernel are converted into soluble sugars by permitting the barley to germinate under controlled conditions. Not all barley is satisfactory for malting, since successful malting depends upon a high percentage of germination, proper moisture content, the absence of other grains, and the starch content and condition and mellowness of the barley itself. In the malting process the barley is first cleaned and then steeped. The purpose of the steeping process is to soak the grain so that sufficient moisture may be absorbed to facilitate germination and also to remove soluble substances injurious to the flavor of the malt. The barley is steeped in cold (55 degrees Fahrenheit) water for from thirty to seventy-two hours, depending on the thickness of the husk and the mellowness of the barley. After steeping, the barley is placed in a room with a steel floor having small perforations through which air is passed. The stem of the barley is permitted to grow from three-quarters to the full length

¹ U. S. Treasury Department, *Annual Report of the Commissioner of Internal Revenue*, 1937 (Washington, Government Printing Office, 1938), pp. 139, 145.

of the grain. Usually American barleys are germinated for six days. The barley is then dried in a kiln, which is a room similar to the growing room, by forcing heated air through the barley. The sprouts wither and are removed in the screening process which follows. The quality of the beer is dependent upon the type of malt used, and the taste, aroma, color, and foam stability of the beer is directly affected by the malt. The average grain mash from which liquors are distilled contains only 10% of malt, and distillers use malt to facilitate the fermentation process.

Oats.—Some oats are processed to manufacture breakfast cereals, but by far the largest quantity is used as feed for horses and other livestock. Custom grinding of oats by country elevators has increased in recent years. Farmers mix concentrates with these oats to be used as livestock feed. The manufacture of oatmeal includes cleaning and hulling the oats and then partially cooking them by the use of live steam. After cooking, the oats are passed through rollers and formed into flakes.

Flaxseed.—To produce linseed oil, flaxseed is cooked and steamed under pressure and then crushed. The raw linseed oil which results is used in the manufacture of paints. Much linseed oil is boiled, since this process is necessary to give the paint a tough film or coat.

Rice.—A grain of rice consists of three principal parts, the husk, the cuticle, and the kernel. The husk does not adhere closely to the kernel, but the cuticle or inner skin, consisting of glutinous or nitrogenous matter, is more closely attached to the kernel. By means of revolving steel discs faced with emery and cement the husks of the rice are removed without crushing the rice kernels. The cuticle remaining on the rice gives it a brown color. These cuticles are removed by passing the rice through a revolving truncated iron cone which is lined with a cement and emery mixture. Surrounding the cone is a screen of wire cloth, from which rubber bars protrude to stop the rice and cause thorough, active attrition which removes the closely adhering husk. The rice is polished in a similar cone made of wood and lined with sheepskin and felt. A small amount of laundry bluing is mixed with the rice to accentuate its whiteness; the rice is then coated with a mixture of talc and glucose to add lustre.

The finished product is divided into four grades: fancy rice, head rice, screenings, and brewers' rice. A barrel of rough rice

weighing 162 pounds typically produces 90 pounds of fancy rice, 6 pounds of head rice, and 8 pounds of screenings, all of which can be coated and sold as commercial rice. The by-products are hulls, bran, and chicken feed.

THE MARKETING OF GRAIN PRODUCTS

Flour.—The principal purchasers of flour are the wholesale and retail food concerns, institutional buyers such as hotels and hospitals, and the commercial bakers. The mill may sell to these buyers either through its own organization throughout the country or through some wholesale flour handler, such as the flour merchants, blenders, brokers, jobbers, and agents. These firms usually have their own sales organization covering the territory in which they operate.

Usually the mill agents and brokers sell in carlot quantities, whereas the jobbers and merchants sell in smaller quantities of one or two barrels or more. The business of the jobbers and wholesale grocers has been declining in recent years with the increase in centralized buying by chain stores and bakeries. The branch offices of the mills or their special representatives and the flour brokers are now the most important functionaries in the distribution of flour.

The mill agents and brokers do not actually handle the flour, and frequently the mill bills the purchaser direct. A commission is paid to the agent or broker based on the quantity of flour sold. Essentially the agent and the broker are similar, except that the mill agent represents a certain mill or mills, whereas the broker places the order with the mill that offers the best terms and price.

Because the qualities of flour can be measured physically and chemically, and orders filled according to specifications, much of the competition between mills is on the basis of price. Except for those mills advertising family flour, which the consumer buys in the original package, the mill brand is not known to the ultimate consumer. Some mills prepare flour to be sold under the private brand names of jobbers, wholesalers, and chain stores. For the bakery trade, however, the name of the company and the brand are considered only when price and quality are equal.

Because of the direct relation between flour prices and wheat prices, mills usually inform their representatives by wire of the prices to be quoted on the various products at the close of the

market each day. These prices are based on the prevailing cash prices for wheat of the specific grades from which the various types of flour are made. Sales are usually made on the basis of these prices for delivery within ninety days.

Corn Products.—The number of products turned out by a wet-milling corn products plant are many and are used in various industries. The channels of distribution of these products are not so direct, therefore, as the movement of flour from mill to baker, or mill to consumer. Furthermore, the products of the corn-refining industry compete with the products of other industries and usually follow the sales practice and techniques of the competing product. For example, the sale of cerelose follows channels of distribution similar to those for sugar, and the price of cerelose is determined by the price of sugar rather than the price of corn. Refined corn oil competes with refined cottonseed oil for consumption as salad dressing and cooking oil, and is sold principally through retail food outlets to the consumer.

In general, corn products resulting from the wet-milling process can be divided into two classes, package goods and bulk goods. Package goods usually carry the brand name of the company manufacturing the product and include such products as syrups, corn oil, domestic laundry starch, and edible cornstarch. The bulk goods include starch, corn syrup, corn sugar, and feeds, and are sold to a number of different industries, including bakers, brewers, confectioners, and ice-cream and chewing-gum manufacturers, as well as to tanners, the textile industries, soap producers, and chemical manufacturers.

Sales are usually made through the company's own sales group. The Corn Products Sales Company, for example, is the selling organization for the Corn Products Refining Company, and it sells directly to the handlers and to the industries using its products.

The products from the dry-milling process are also sold direct, but since most of these products are sold to the grocery and feed trade, most sales are made to wholesalers, brokers, and jobbers.

Other Grains.—Barley, flaxseed, and the rye used in the distilling industry lose their identity after processing, and it is impossible to trace them to their final destination. Oats processed into oatmeal are sold through regular grocery trade channels by such

concerns as the Quaker Oats Company. Rice is also sold to the grocery trade either in trade-marked packages or in bulk.

CONSUMPTION OF GRAINS

Wheat.—The per capita consumption of flour has been declining over a period of years, and during the depression of the early 1930's a new low point in per capita consumption of wheat was reached (see Exhibit 14). Changes in dietary habits and in living habits have caused this decline. The increase in the number of central heating plants and the decline in the amount of physical exertion of the factory and office workers and the housewife have

EXHIBIT 14
PER CAPITA CONSUMPTION OF FLOUR IN THE UNITED STATES, 1879-1880
TO 1937-1938

Year	Pounds per capita	Year	Pounds per capita
1879-1880	224	1929-1930	172
1889-1890	224	1930-1931	167
1899-1900	224	1931-1932	162
1909-1910	210	1932-1933	159
1919-1920	175	1933-1934	154
1924-1925	176	1934-1935	154
1925-1926	176	1935-1936	154
1926-1927	176	1936-1937	154
1927-1928	176	1937-1938	154
1928-1929	176		

Source: Stanford University Food Research Institute, *Wheat Studies*, Vol. 15, No. 4, "The World Wheat Situation, 1937-1938," by Joseph S. Davis, Table XXVIII, p. 251, for 1924-1925 to 1937-1938; figures for 1879-1880 to 1919-1920, based on data given in *Wheat Studies*, Vol. 4, No. 2, p. 101 (barrel figures converted at ratio of 196 pounds to a barrel).

reduced the number of calories required per capita. Wheat and other cereals have been replaced by sugar; total food requirements per capita have declined; diet is now more diversified, and other and more expensive foods have been substituted for wheat products.¹ It also seems possible that the decline in home baking has had some effect on the decrease in consumption of flour. The increase in number of urban residents living in apartments and the changes in living habits have reduced the amount of cooking done by the housewife, and undoubtedly flour consumption has suffered as a consequence. It is estimated in the trade that only 55% of the flour is now sold to the household or family trade,

¹ Stanford University Food Research Institute, *Wheat Studies*, Vol. 2, No. 8, "The Decline in Per Capita Consumption of Flour in the United States," by Holbrook Working (Stanford, July, 1926), pp. 265-266.

whereas 40% is sold to the baking industry and cracker manufacturers. Public institutions, hotels, and restaurants purchase the remainder.

The World War apparently had a very definite effect on flour consumption in the United States. The increased wages of labor permitted the substitution of more expensive foods; but, probably more important, the restriction of flour consumption in wartime

EXHIBIT 15
PRODUCTION AND FARM DISPOSITION OF WHEAT, AVERAGE, 1927-1931;
ANNUAL, 1932-1936
(In thousands of bushels)

Year beginning July	Produc- tion	Used for seed		Fed to live- stock	Ground at mills for home use or ex- changed for flour	Sold or for sale
		Total	Home grown			
Average 1927-1931	888,159	83,563	79,179	98,204	9,802	700,973
Annual						
1932	756,927	83,513	79,565	124,912	16,073	536,377
1933	551,683	77,832	68,132	72,261	16,284	395,006
1934	526,393	82,585	66,408	83,700	15,457	360,828
1935	626,344	87,555	75,320	83,168	15,870	451,986
1936	626,766	96,872	72,036	88,272	13,414	453,044

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 9, p. 19.

had a permanent effect, and the losses were not regained.¹ The recent depression also resulted in a sharp drop in the per capita consumption of flour. Not all factors were working toward a declining consumption, however. The per capita consumption of corn meal declined from 0.597 barrel in 1889 to 0.139 barrel annually in 1923;² flour was substituted for corn meal, particularly in the South, and this substitution prevented a more substantial decline in per capita flour consumption.

All wheat is not consumed as flour, since a relatively stable amount of approximately 80,000,000 bushels a year is used for seed, and varying amounts are used as feed on farms where the

¹ Stanford University, Food Research Institute, *Wheat Studies*, Vol. 4, No. 2, "Statistics of American Wheat Milling and Flour Disposition since 1879" by Holbrook Working (Stanford, December, 1927), p. 63.

² Stanford University Food Research Institute, *Wheat Studies*, Vol. 2, No. 8, p. 279.

wheat is produced. The amount of wheat used as feed varies with the price and the quality of the wheat produced. For example, rust damaged wheat may be fed to livestock when it cannot be sold at all or can be sold only at a very low price. The data in Exhibit 15 show the use of wheat produced during recent years.

The production of flour is, however, the most important use of wheat, and large commercial bakeries are the most important purchasers of flour. Large baking corporations have expanded in recent years as the consumption of bakery products has increased. The principal bakery product is, of course, bread. Exhibit 16 shows the percentage of the price of a loaf of bread which is returned to the various agencies cooperating in marketing the farmer's product.¹

EXHIBIT 16
DISTRIBUTION OF CONSUMER'S PRICE OF A POUND OF BREAD,*
1922-1924

Agency	Cents	Per Cent
Producer of wheat.	1.145	13.40
Country elevator.	0.068	0.79
Transportation and terminal agencies for wheat.	0.278	3.25
Flour miller.	0.406	4.75
1. Costs above wheat.	0.331	3.87
2. Net profit.	0.075	0.88
Transportation agencies for flour.	0.263	3.08
Wholesale baker.	5.110	59.77
1. All costs except ingredient.	3.538	41.38
2. Ingredient costs other than flour.	0.921	10.77
3. Net profit.	0.651	7.62
Retail grocer.	1.279	14.96
Total gross margins (retail price).	8.549	100.00

* Bread manufactured by the exclusively wholesale bakers.

Source: U. S. Federal Trade Commission, *Competition and Profits in Bread and Flour*, Senate Document No. 98, Seventieth Congress, First Session (Washington, Government Printing Office, 1928), Table 1, p. 12.

The principal companies in the baking industry are *Continental Baking Corporation*, *General Baking, Inc.*, *Purity Bakeries Corpora-*

¹ A less complete survey made at a later date by the Federal Trade Commission indicated the same distribution of the consumer's dollar. This later study gave figures showing that the average price in 1935 for a pound of bread sold at retail in 51 cities was 8.3 cents, of which the average retail distributor's margin was 1.6 cents, the bakery processor's margin was 4.6 cents, the flour processor's margin was 0.6 cent, the wheat merchant's margin was 0.1 cent, transportation and sales cost was 0.3 cent, and the farmer received 1.1 cents. See U. S. Federal Trade Commission, *Agricultural Income Inquiry*, Part I, Principal Farm Products (Washington, Government Printing Office, 1938), p. 130.

tion, *Ward Baking Corporation*, *National Biscuit Company*, *Loose-Wiles Biscuit Company*, and *United Biscuit Company of America*. The Continental Baking Corporation owns 87 bakeries in 68 cities and sells under its Wonder and Hostess trade-marks principally to retailers. This company is the largest bread baker. The second largest bread-baking company is General Baking, Inc., which sells under the Bond Bread brand. Purity Bakeries Corporation is the only large baking company owning an extensive chain of retail outlets; these outlets are concentrated in the metropolitan areas of Chicago, New York, and Philadelphia. Ward Baking Corporation sells both to retail stores and through bread and cake routes making house-to-house deliveries. National Biscuit Company is the largest unit in the cracker and biscuit division of the industry, but the company also has bread-baking units in a number of cities. Loose-Wiles Biscuit Company and the United Biscuit Company of America are also important producers of crackers and biscuits.

Corn.—Reference has been made in a previous chapter to the fact that from 85% to 90% of the total corn crop is fed to livestock and poultry.¹ The use of corn for industrial and commercial purposes has declined during the past 20 years because of the reduced demand for corn meal and, during prohibition, the reduced demand for the distillation of spirits. The revival of the whiskey and brewing industry has not yet expanded to the point where consumption of corn in these industries makes up for the decline in volume of corn utilized by the dry-milling division of the industry.

GOVERNMENT ACTIVITIES AFFECTING GRAINS

Wheat.—Government legislation affecting the wheat industry has been enacted at intervals since 1917. This legislation has varied from emergency wartime control and emergency depression control to crop insurance and price-fixing attempts to stabilize the farmers' income.

In 1917 the Food Administration Grain Corporation was established as a part of the wartime activities of the government to control the food supply of the nation. Prices were set at which the Grain Corporation would buy wheat to supply the needs of this country and the other allied powers. The corporation was dis-

¹ See Chapter III, "The Livestock and Meat-packing Industry."

solved in 1920 and the capital supplied by the United States Treasury was returned intact with interest.¹

With the decline in wheat prices there was considerable agitation on the part of the farmers for the enactment of legislation to assist them. The Capper-Volstead Act of 1922,² encouraging the establishment of cooperatives, and an increase in the tariff on wheat to 42 cents a bushel in 1924 were the only official forms of assistance extended.

In the meantime, however, wheat farmers were establishing cooperatives similar to those established by farmers producing other commodities in an attempt to perform marketing functions more efficiently and to increase their returns. Fourteen of these organizations, known as "wheat pools," were organized between 1920 and 1924.³ In plan and operation these pools were similar to the other cooperative pools which were organized at this time. The farmer delivered his wheat to the agent of the association at a local elevator, received approximately 60% of the prevailing price for wheat, and after the season was over received a final settlement depending on the average price for the grade and quality which he delivered to the elevator.⁴ Each pool was operated within a given state, since attempts to coordinate the marketing activities of the state associations were unsuccessful. In 1925 only nine pools were operating, and in 1930 the pools still in operation joined with the local cooperative elevators and the terminal sales agencies to form the Farmers National Grain Corporation. During the period of operations of the wheat pools, the highest percentage of the commercial wheat crop handled by the pools was 4.8%, in 1923.⁵

The Farmers National Grain Corporation was organized by the cooperative grain marketing associations under the Agricultural Marketing Act of 1929 to assist in placing producers in control of the channels of distribution for wheat. This corporation was

¹ See Surface, Frank M., *The Grain Trade During the World War* (New York, The Macmillan Company, 1928), and his *The Stabilization of the Price of Wheat During the War and Its Effect upon the Returns to the Producer* (Washington, U. S. Grain Corporation, 1925).

² 42 Stat. 388.

³ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, p. 48.

⁴ Knapp, J. G., *The Hard Winter Wheat Pools* (Chicago, University of Chicago Press, 1933), p. 67.

⁵ U. S. Federal Farm Board, Bulletin No. 9, *Statistics of Farmers' Selling and Buying Associations, 1863-1931*, by R. H. Elsworth (Washington, Government Printing Office, 1932), Table 19, p. 46.

established to buy and sell grain, as well as to sell consigned grain for the account of local cooperatives, and to own and operate both local and terminal elevators. After 1933 a policy of disposing of the local elevators was begun,¹ and in 1935 its grain elevators were taken over by the Federal government as security for advances which were not repaid. After additional financing from the government, the corporation wound up its affairs at the close of the fiscal year ending June 30, 1938. Officers of the corporation stated that short grain crops of recent years reduced volume to the point where the concern could not be operated profitably. Others laid the failure to the ineptness of officials in operating a complicated business on a vast scale.

During the 1929-1930 season of the Federal Farm Board, advances were made to cooperatives to assist them in making larger advances to members than would otherwise be possible. Advances of 10 cents a bushel were made in addition to the funds secured by the cooperatives from primary lenders on the security of wheat in storage. Cooperatives were thus permitted to make total advances to members of about 90% of the value of wheat as determined by current prices.² These loans were not ample, however, and in October the board began to loan full value based on market prices.³ In the early part of 1930 wheat prices collapsed, and in February the Grain Stabilization Corporation was established by the Federal Farm Board to buy the wheat from the cooperatives and lend support to the market.

By the end of June, 1930, the Grain Stabilization Corporation held over 60,000,000 bushels of wheat and futures contracts, which, combined with the cooperatives' holdings, represented approximately one-half of the visible supply of the United States.⁴ Prices continued to decline, and by the end of the year they were lower than at any time in the previous forty years. In November the corporation began to make purchases in such volume that prices were pegged in American markets. Through these operations, holdings were increased to 256,000,000 bushels. Efforts were made to sell wheat abroad, and a total of 30,000,000 bushels

¹ U. S. Farm Credit Administration, Bulletin No. 3, pp. 52-55.

² U. S. Federal Farm Board, *First Annual Report* (Washington, Government Printing Office, 1930), p. 9.

³ *Ibid.*, p. 27.

⁴ *Ibid.*, p. 32.

of the corporation's holdings had been exported in the form of wheat or flour by June, 1931.¹

No purchases were made of the 1931-1932 crop, and attention was concentrated on reducing the stabilization stocks, since all the \$500,000,000 in the revolving fund authorized by the Agricultural Marketing Act was tied up in the stabilization operations of wheat and cotton. Between June 30, 1931, and June 30, 1932, a total of 147,500,000 bushels was disposed of by the corporation. Of this amount, 60,000,000 bushels had been sold in the export market at the rate of 5,000,000 bushels per month; 40,000,000 bushels were donated to the American Red Cross as a result of a congressional resolution; 25,000,000 bushels were sold to the Brazilian government and paid for in coffee; 15,000,000 bushels were sold on a three-year credit to the Chinese government; and 7,500,000 bushels were also sold on a three-year credit to the German government. Later an additional 45,000,000 bushels were donated to the Red Cross.

All the Grain Stabilization Corporation's holdings of cash wheat and futures contracts had been disposed of by April 29, 1933.² The Farm Credit Administration inherited its unrealized assets, which consisted of the coffee and the notes of the German and Chinese governments. As of December 31, 1937, there was a total of \$73,310,029 in outstanding loans resulting from the operations of the Grain Stabilization Corporation.³ These loans, added to the value of the wheat donated to the Red Cross, resulted in a total of approximately \$200,000,000 lost in the attempt to stabilize the price of wheat.

Wheat was included in the Agricultural Adjustment Act of 1933 as a basic commodity, and was the first commodity for which a program of adjustment was announced.⁴ Although plowing up wheat was considered, reports forecasting reduction in the size of the crop because of adverse weather conditions obviated the necessity of destroying any part of the year's harvest.

¹ U. S. Federal Farm Board, *Third Annual Report* (Washington, Government Printing Office, 1932), p. 66.

² U. S. Farm Credit Administration, *First Annual Report, 1933* (Washington, Government Printing Office, 1934), pp. 56-57.

³ U. S. Farm Credit Administration, *Fifth Annual Report, 1937* (Washington, Government Printing Office, 1938), Table 75, p. 187. Included in this amount was the balance due on the notes of the German government, amounting to \$2,661,000.

⁴ Nourse, E. G., Davis, J. S., and Black, J. D., *Three Years of the Agricultural Adjustment Administration* (Washington, The Brookings Institution, 1937), p. 93.

The adjustment program for wheat eventually developed as a plan to pay farmers approximately 30 cents a bushel on an allotment calculated at 54% of the average amount of wheat produced during the base period 1928-1932. To receive these payments producers had to agree not to plant more than a specified percentage of their base acreage in 1934 and 1935. This base acreage was supposed to be the acreage from 1928 to 1932, but since many farmers did not keep such records, in many cases the acreage was calculated on the average acreage planted from 1930 to 1932.¹ The curtailment of acreage was set at 85% in 1934 and at 90% for 1935.

A processing tax of 30 cents a bushel was set to provide the funds for benefit payments. These benefit payments to producers amounted to \$98,600,000 for the 1933 crop, \$101,600,000 for the 1934 crop, and \$115,600,000 for the 1935 crop.² For the 1936 crop, growers were permitted to plant up to 95% of their base acreage, but the invalidation of the Agricultural Adjustment Act by the United States Supreme Court made payments illegal. A special appropriation was passed to pay 21½ cents a bushel to those growers who had carried out their contract by planting less in the fall before the Supreme Court decision.

Other government activities under the Agricultural Adjustment Administration included an international agreement setting up export quotas and restricting acreage in the principal producing countries, a stimulation of exports of Pacific Northwest wheat, and regulation of the grain exchanges. The international wheat agreement, signed at London in August, 1933, was the outgrowth of several preceding conferences of the world's leading wheat producers. Signatory nations agreed to a 15% reduction in wheat production and set quotas for exports during the 1933-1934 and 1934-1935 seasons. The plan failed because of declining prices and failure of some of the countries to carry out the provisions of the agreement during the first year.³

Under the Pacific Northwest export arrangement loans were made by the Reconstruction Finance Corporation to the Chinese

¹ Davis, J. S., *Wheat and the AAA* (Washington, The Brookings Institution, 1935), Chapter III.

² U. S. Department of Agriculture, Agricultural Adjustment Administration, *Agricultural Adjustment, 1933 to 1935* (Washington, Government Printing Office, 1936), p. 159.

³ Davis, *op. cit.*, Chapter X.

government to permit the purchase of wheat and flour exported under a marketing agreement. This agreement between representatives of producers, exporters, millers, and bankers was filed with the Agricultural Adjustment Administration in September, 1933. It provided that part of the processing tax revenues be applied to subsidize the exports of wheat and flour. Wheat and flour sales amounting to 28,400,000 bushels were made under this agreement and shipped to China, Japan, the Philippines, and other Far Eastern markets.¹ In 1936, subsidies were paid to export flour to the Philippines. These payments were made from the customs revenue fund under the amendment to the Agricultural Adjustment Act in 1935. An equivalent of 863,000 bushels of wheat was exported under this arrangement.²

A sharp break in grain prices in July, 1933, resulted in regulations designed to set permanent limits to daily price fluctuations, to limit speculation commitments, and to provide adequate margins.

The effects of the Agricultural Adjustment Administration's program on wheat production were obscured by adverse weather conditions. For four years, from 1933 through 1936, domestic production was reduced by droughts. In three of these years domestic supplies were so low that it was necessary to import wheat to supply the needs of the country. One effect was noticeable, however, when benefit payments for not raising wheat were made to farmers whose crops were ruined by the drought. "In many instances, allotment payments constituted the principal source of income for farmers in the worst drought area."³

The invalidation of the Agricultural Adjustment Act resulted in invalidation of the contracts previously signed for the 1936 crop, and progress under the Soil Conservation and Domestic Allotment Act was slow. The severe drought, particularly in the northern Great Plains, resulted in some changes in plans, and the conservation program was not rigidly applied. It was reported that 73% of the crop land in the wheat region was included under the soil conservation program, and most of the acreage diverted from a

¹ *Ibid.*, Chapter IX.

² U. S. Department of Agriculture, Agricultural Adjustment Administration, *Agricultural Conservation, 1936* (Washington, Government Printing Office, 1937), p. 77.

³ U. S. Department of Agriculture, Agricultural Adjustment Administration, *Agricultural Adjustment, 1933 to 1935* (Washington, Government Printing Office, 1936), p. 153.

“soil depleting” crop was wheat land.¹ Soil conservation programs and payments for the diversion of wheat land continued in 1937.

The Agricultural Adjustment Act of 1938,² passed in February, provided the mechanism for production control through marketing quotas, through loans on wheat at times when prices might drop to a point where such assistance was deemed to be necessary, and through crop insurance, to be effective beginning with the 1939 harvest.

The calculations to be made by the Secretary of Agriculture to determine the national acreage allotment and to determine when a national marketing quota was to be effective were similar to those to be made for cotton.³ In the case of wheat, the allotment was to be the Secretary's estimate of the acreage required to produce, with the carry-over, “a supply for each marketing year equal to a normal year's domestic consumption and exports plus 30 per centum thereof.”⁴ The allotment for 1938 was written into the law as 62,500,000 acres. The quota was to be the national allotment less the carry-over and less the amounts used on the farms for feed and seed. The quotas were to be effective only after two-thirds of the farmers voted in favor of the plan. There was no quota for the 1938 crop, since a provision of the act stated that no quotas would be in effect unless Congress voted for parity payments before May 15. No marketing quota system was planned for the 1939-1940 season, since the May 15 deadline passed without an announcement from the Secretary of Agriculture that a prospective supply of 35% in excess of a normal year's domestic supply and exports existed.

Loans on wheat were to be made available to farmers cooperating under the program whenever the farm price on June 15 was below 52% of parity, or when the July crop estimate for wheat was above the normal year's domestic consumption and exports.⁵ No loans were to be made, however, unless the producers were in favor of establishing marketing quotas for that year. Because of the large crop in 1938, it was announced that loans on wheat

¹ U. S. Department of Agriculture, Agricultural Adjustment Administration, *Agricultural Conservation, 1936* (Washington, Government Printing Office, 1937), p. 48.

² Public No. 430, Seventy-fifth Congress, Third Session.

³ See Chapter IV, “The Cotton and Cotton-textile Industry.”

⁴ Public No. 430, Section 333.

⁵ *Ibid.*, Section 302(b).

would be made when the crop was harvested. The loan rates were outlined in terms of basic rates at terminal markets, which averaged from 70 to 79 cents a bushel. Rates varied according to location, classes and subclasses of wheat, grades of wheat, and discounts for "smutty" and "garlicky" wheat.¹ Crop insurance beginning with the harvest of 1939 was provided for in the act by the establishment of a Federal Crop Insurance Corporation and the appropriation of \$100,000,000 for the stock of the corporation. Coverage included loss from drought, flood, wind, winter-kill, insect infestation, and plant disease. Insurance was to be written for not less than 50% or more than 75% of the "recorded or appraised average yield on the insured farm for a representative base period."² Losses were to be paid either in wheat or in cash.³

In August, 1938, a new method of assisting wheat producers was devised. The Federal Surplus Commodities Corporation began to purchase wheat and to resell to exporters at a lower price. In September an export subsidy on flour was announced at 30 cents a barrel, which was later raised to 60 cents a barrel. By May 1, 1939, sales of wheat and flour for export since the first of July, 1938, totaled 109,000,000 bushels, of which over 77,000,000 bushels were subsidized.⁴

A summary of government activities in wheat requires a recapitulation of almost every scheme ever suggested as a solution to "the agricultural problem" except export debentures. To date, all have been failures. The ironic turn of nature has emphasized the weaknesses of the various plans as though a deliberate attempt had been made to embarrass the government officials responsible for the program. During the time when acreage was reduced and production control was emphasized, the severe droughts made human control measures seem puny. In 1938, after crop insurance legislation had been enacted, a bumper crop turned all attention to the problem of distributing the surplus without a price collapse.

¹ Stanford University Food Research Institute, *Wheat Studies*, Vol. 15, No. 1, "World Wheat Survey and Outlook, September, 1938," by H. C. Farnsworth and H. Working (Stanford, September, 1938), pp. 24-25.

² Public No. 430, Section 508(a).

³ In July, 1939, it was announced that the same general plan would be followed for insuring the 1939-1940 wheat crop.

⁴ Stanford University Food Research Institute, *Wheat Studies*, Vol. 15, No. 8, "World Wheat Survey and Outlook, May, 1939," by V. P. Timoshenko and Holbrook Working (Stanford, 1938), p. 375.

Control of either price or supply of wheat by the government involves many questions that have not been clearly recognized. It is obvious from the failures that control of demand must be included in such a scheme to ensure success. In other words, quotas must be established for consumption as well as for production, and in a democracy, in peacetime, such authority is not only unpleasant but implies additional restrictions of freedom and liberty. Although this establishment of consumption quotas is one method of assisting wheat farmers which has not yet been tried, it seems unlikely that it will be attempted in the near future.

Corn.—The Agricultural Adjustment program for corn was included with the hog program.¹ In the Agricultural Adjustment Act of 1938, however, special provisions were made for the establishment of marketing quotas for corn and for loans by the Commodity Credit Corporation on corn.

Whenever the normal supply of corn is exceeded by more than 10%, marketing quotas are to be effective,² provided that a referendum of farmers results in a two-thirds vote in favor of quotas. In 1938 the calculation of the "normal supply" was revised three times, until finally the figure was above the estimated supply for 1938; consequently, no quotas were established and no referendum was taken.³ It is impossible to say whether the widespread dissatisfaction among farmers concerning the Agricultural Adjustment Act of 1938 and its administration, with particular reference to the method of setting allotments or quotas, had anything to do with the fact that estimates were revised until they exceeded the point where it was necessary to secure an expression of opinion from the farmers.

Corn loans were authorized by the Agricultural Adjustment Act of 1938 whenever the November crop estimate for corn is in excess of a normal year's domestic consumption and exports, or when the farm price on November 15 is below 75% of parity. The loans are to vary from 52% to 75%, depending on the estimated size of the crop. As in the case of wheat and cotton, no loans are to be made unless marketing quotas have been voted by the farmers.

¹ See Chapter III, "The Livestock and Meat-packing Industry."

² Public No. 430, Section 322(a).

³ *The Wall Street Journal*, Aug. 11, 1938, p. 1.

Rye.—Rye was added to the list of basic commodities under the Agricultural Adjustment Act by the Jones-Connally Act of 1934.¹ No program was carried out during 1935 since rye was on an import basis. For 1936 a plan was formulated for rye harvested as grain, but the Agricultural Adjustment Act was invalidated before the program could be put into effect.²

Rice.—Rice was included as one of the basic commodities under the Agricultural Adjustment Act of 1933. Crops had already been planted, yields were expected to be low, and consequently no adjustment program was attempted in 1933.³ No production adjustment was undertaken in 1934, since the marketing agreements which were in effect were deemed adequate to carry out the policy of the Agricultural Adjustment Act.

The marketing agreements resulted in production control and were continued through 1934. In both the California agreement and the agreement with southern millers and producers the crop was limited by paying only 60% of the current price due the grower from the mill and distributing the remaining 40% to cooperating growers who had reduced their acreage by 20% of their 1929-1933 average. These agreements were signed by the rice millers and representatives of the rice growers in 1933. No processing taxes were applied. Since both cooperators and noncooperators received the benefits of higher prices and not all the southern millers entered the agreement, there was some dissatisfaction with the plan. Consequently, an amendment to the act was passed in 1935 providing for a processing tax on rice of 1 cent a pound. Benefit payments were provided for, and the noncooperating mills which had previously paid 100% of the purchase price at the time of delivery, instead of withholding 40% as did the cooperating mills, no longer had an advantage in the markets. Producers received under the new plan approximately \$9,500,000 for reducing acreage.

Under the Soil Conservation and Domestic Allotment Act payments of \$1 an acre were made for each acre of rice land in soil-conserving and soil-building crops. In addition, a payment

¹ Public No. 142, Seventy-third Congress, 48 Stat. L. 528. In U. S. Department of Agriculture, *Agricultural Adjustment, 1933-1935*, p. 260, the date when rye was added as a basic commodity is given as April 7, 1935, and is obviously a typographical error.

² U. S. Department of Agriculture, *Agricultural Adjustment 1933-1935*, pp. 259-263.

³ *Ibid.*, pp. 237-238.

of 20 cents a 100 pounds was made on the producer's "domestic consumption quota," or that part of the average production of rice consumed in this country in past years. In order to qualify for these payments, 20% of the base acreage had to be planted in soil-building crops, or, in other words, rice acreage had to be reduced 20%.

Rice is also included in the Farm Act of 1938 with respect to the establishment of marketing quotas, although no specific provisions are included with respect to loans on rice. National marketing quotas for rice were to be established, after a two-thirds vote by the growers, when the total supply of rice for a crop year was expected to exceed the normal supply by more than 10%. It was stated in the act that no marketing quotas were to be in effect for the marketing year beginning August 1, 1938.

Other Grains.—Flax, barley, and grain sorghums were also added to the list of basic commodities under the Jones-Connally Act of 1934.¹ A program for flaxseed was initiated, but was never completed. No programs were ever developed for barley and grain sorghums.²

INTERNATIONAL TRADE IN GRAINS

Wheat.—As the world's premier cereal crop, wheat is an important factor in international trade. Before and during the World War, export markets for wheat were of prime importance to the American farmer, and production was geared to this demand. With the increase of production in foreign markets, with the increasing emphasis on self-sufficiency programs, and with the establishment of higher trade barriers, export demand for American wheat has declined. In fact, with the sharp curtailment of domestic wheat production which resulted from drought, the United States was a net importer of wheat in 1935 and 1936.

Exports and imports of the principal countries participating in international trade in wheat are shown in Exhibit 17. The decline in exports of wheat from the United States and the decline in imports of Germany and Italy are the most striking points in this exhibit.

¹ Public No. 142, Seventy-third Congress, 48 Stat. L. 528. In addition to rye, flax, barley, and grain sorghums, this amendment added cattle and peanuts to the list of basic commodities.

² Nourse, Davis, and Black, *op. cit.*, p. 111.

EXHIBIT 17

INTERNATIONAL TRADE IN WHEAT, INCLUDING FLOUR, IN TERMS OF GRAIN, AVERAGES, 1925-1929; 1930-1934;
ANNUAL, 1934 TO 1936
(In thousands of bushels)

Country	Average, 1925-1929		Average, 1930-1934		1934		1935		1936*	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Principal Exporting Countries:										
Canada.....	306,094	821	224,270	376	190,655	806	187,647	521	264,867	383
United States†.....	173,535	14,676	84,021	14,913	36,538	18,547†	15,731	38,933	19,079	53,226
Argentina.....	163,164	7	137,034	1	181,727	0	146,313	0	63,209	0
Australia.....	95,770	3	124,500	3	94,110	4	101,433	3	97,860	2
Hungary.....	22,164	105	18,111	2	19,228	0	14,820	0	24,044	0
Union of Soviet Socialist Republics.....	16,153	3,449	49,678	1,394	10,390	1,650	27,960	1,221	4,968	633
Principal Importing Countries:										
United Kingdom.....	12,360	217,084	9,859	227,408	7,720	214,016	6,915	208,375	6,162	208,209
Germany.....	11,898	87,909	15,203	33,056	15,943	23,897	1,116	5,976	3,227	2,752
Italy.....	2,328	82,586	6,193	40,337	9,293	17,659	10,456	20,322	7,735	19,654
France.....	633	46,713	18,415	53,678	22,843	30,046	37,908	28,793	18,343	22,015
Belgium.....	2,960	43,576	3,684	47,709	2,823	48,212	2,293	38,928	2,078	43,994

* Preliminary.

† Imports include all wheat, that is, dutiable for consumption, free for grinding in bond and export, and dutiable for feed. Exports of flour include flour ground from domestic wheat and from wheat imported in bond.

‡ Beginning 1934, imports for consumption.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 23, p. 29.

Another important shift in international trade in wheat during the last twenty years has been the withdrawal of Russia from the world markets. Before the World War, Russia was one of the principal surplus-producing countries, supplying wheat to western Europe. Since 1916, however, Russia has not been an important factor in the export markets, except for the two crop years of 1930-1931 and 1931-1932. At that time, the Soviet government was in need of foreign exchange; favorable crops provided what seemed to be adequate supplies and reserves; and, as a consequence, wheat was exported.¹

Since 1930, unfavorable weather conditions and relatively high production costs have combined with other factors to reduce exports from the United States. The leading exporting countries which have held their places in world markets are Canada, Argentina, and Australia. Apparently these three countries can produce more cheaply for the world market than can the United States.²

Both Canada and Australia produce wheat of good milling qualities; Argentina produces wheat with a high gluten content. The Danube countries send their wheat for the most part to their immediate neighbors; lower transportation costs make this wheat desirable in these markets.

The barriers to international trade in wheat which have been thrown up in recent years have changed the export situation. Until 1928, tariffs were the principal barriers to wheat exports, but with increasing difficulties in securing foreign exchange, with declining world wheat prices, and with the development of self-sufficiency programs, additional restrictions have been put into effect. These restrictions have taken the form of milling quotas, which require a specific quantity of domestic wheat to be mixed with imported wheat, import quotas, higher tariffs, control and allotment of foreign exchange, licenses, and the establishment of government monopolies.³ These measures were obviously

¹ Stanford University Food Research Institute, *Wheat Studies*, Vol. 13, No. 7, "Soviet Agricultural Reorganization and the Bread-Grain Situation," by V. P. Timoshenko (Stanford, April, 1937), p. 357.

² U. S. Department of Commerce, Trade Information Bulletin No. 210, *International Competition in the Production of Wheat for Export* (Washington, Government Printing Office, 1924), p. 3.

³ U. S. Department of Agriculture, *World Trade Barriers in Relation to American Agriculture*, Senate Document No. 70, Seventy-third Congress, First Session (Washington, Government Printing Office), p. 147.

designed to encourage production in the import countries and to reduce the amount of wheat required from other countries.

In the exporting countries emergency measures have also been instituted. In 1935 Canada established a wheat board to stabilize the holdings of Canadian cooperatives by purchasing wheat from producers at fixed prices. Formerly a large proportion of the Canadian crop had been handled by the provincial pools, which were much stronger and had secured a higher percentage of producer participation than the American pools. The Argentine Grain Regulating Board also fixed minimum prices to be paid producers. In Argentina, as well as Australia, however, exchange depreciation assisted in moving wheat freely and in compensating producers. In addition, the lack of storage facilities and heavy external debts forced these two countries to adopt a fairly free selling policy regardless of price.¹

In the United States, the severe droughts reduced production to a point where exports were not a problem, and it was necessary to import wheat to supply the needs of the country. Flour exports from the United States, which in recent years have constituted only a small percentage of total exports of wheat, declined in 1935-1936 to new low levels.² This reduction in flour trade was world-wide, and the decline had been in progress for eight years.³

The world wheat agreements described above were not successful as a solution to the problems of international trade in wheat. With the increased exports and trade in 1937, interest in securing a world wheat agreement dwindled. A further complication which was introduced into the international trade in wheat was the substantial increase in ocean freight rates on grain in 1936 and 1937. Wars, increased trade, and the unusually low level of rates in preceding years resulted in an increase in rates of almost 100%.⁴ Rates were reduced in 1938 but to a level well above that of the rates in effect from 1930 through 1935.

Because of variations in crops, the positions of the various countries in international trade changed considerably in 1937-

¹ Patton, H. S., "Experiments in Wheat Control: U. S. Prices and the Canadian Wheat Board," *The Annalist*, Vol. 48, July 31, 1936, p. 148.

² Stanford University Food Research Institute, *Wheat Studies*, Vol. 14, No. 4, "The World Wheat Situation, 1936-1937," by J. S. Davis (Stanford, December, 1937), p. 139.

³ *Ibid.*, p. 144.

⁴ Stanford University Food Research Institute, *Wheat Studies*, Vol. 15, No. 2, "Shipping and Freight Rates in the Overseas Grain Trade," by V. D. Wickizer (Stanford, October, 1938).

1938. Australia became the largest exporter of wheat, and the United States returned to prominence as the second largest exporter. The poor crops in Canada and Argentina in 1937 resulted in small exports from these countries.¹

The 1938 world wheat crop harvested was the largest ever recorded.² Toward the end of the season, however, it appeared that neither the United States nor the Canadian carry-over would be of record size.³ Meetings of an International Wheat Conference were held in London in January, April, and July, 1939. As in any international agreement, the question as to the amount of the quotas to be allocated to each country proved to be the principal stumbling block, and no official agreement had been signed by the middle of July, 1939.

Corn.—It has been pointed out above that only a small proportion of the corn crop of the United States enters commercial channels. Only a negligible proportion of this amount is exported, and in 1935 and 1936 the United States was a net importer of corn.

Argentina is the most important exporter of corn, averaging annually about 200,000,000 to 300,000,000 bushels. Rumania is the second largest exporter, averaging only one-tenth as much as Argentina. The United Kingdom imports the most corn, although the Netherlands, France, Belgium, and, until recent years, Germany, import substantial quantities.

Barley.—In the 1920's the United States was the most important exporter of barley, principally of the malting type. In 1934 and 1936, however, the United States was a net importer of barley. The principal exporting countries in recent years have been Canada, Rumania, Poland, Argentina, and the Union of Soviet Socialist Republics. The United Kingdom, Belgium, the Netherlands, and France are the most important importing countries.

Oats.—Argentina and Canada are the principal exporters of oats, although in the 1920's the United States shipped abroad an average of 20,000,000 bushels of oats annually. The United Kingdom and Switzerland are the two largest importers.

¹ Stanford University Food Research Institute, *Wheat Studies*, Vol. 15, No. 1, "World Wheat Survey and Outlook, September, 1938," by H. C. Farnsworth and Holbrook Working (Stanford, September, 1938), p. 3.

² Stanford University Food Research Institute, *Wheat Studies*, Vol. 15, No. 8, "World Wheat Survey and Outlook, May, 1939," by V. P. Timoshenko and Holbrook Working (Stanford, May, 1939), p. 366.

³ *Ibid.*, p. 387.

Rye.—In recent years Poland has moved into first rank as the most important exporter of rye. In 1934, 1935, and 1936 Poland exported from three to four times as much rye as the second largest exporter, Argentina. Denmark and Norway are the principal importers, although the United States was the world's largest importer of rye in 1934 and 1935.

Flaxseed.—Argentina is by far the most important exporter of flaxseed, with British India in second place, exporting less than one-sixth as much as Argentina. The United States is the largest importing country, usually importing slightly more than the Netherlands, the United Kingdom, France, or Germany.

Rice.—The United States is not an important figure in the world rice trade, and is completely overshadowed by such countries as British India, Indo-China, and Siam, which export annually more than 3,000,000,000 pounds of rice, principally to China, British Malaya, Ceylon, and France. Shipments of rice to Alaska, Hawaii, and Puerto Rico account for approximately one-quarter of the production of the United States each year.

APPRAISAL OF PROBLEMS

Except for rice, the problems inherent in the trade of each grain are roughly similar, since these grains are grown in the same areas, some being planted in rotation with others, and are marketed through the same channels. Most of the grains also compete with one another as livestock feed, depending on their relative prices. On the other hand, the processing varies, and the ultimate market is different for each of the grains.

The problems of the handlers and the processors of grain are directly affected by the farmers' problems and by the steps taken to find solutions. In the case of wheat, it has been pointed out that the milling industry has at times shifted with the changes in the center of wheat production. At the present time the wheat farmer in the United States is faced with many problems. In some sections there is a grave question as to whether soil and weather conditions will permit the continued cultivation of the land for the production of wheat. This problem is usually ignored during the seasons of favorable weather until another dry period forces the farmers and the public to give it attention. Even with good weather, however, the wheat farmer will be confronted with difficulties, and favorable weather may even accentuate

them. The increasing world production and a continuance of the decline in per capita consumption in this country will result in large surpluses and low prices if present conditions prevail. Since raising wheat is so definitely commercial farming, the consequences are serious when the income of this group of farmers is reduced substantially.

The problems of the wheat farmers are not easy to solve. Neither the farmers' attempts to control, or at least to take part in the business functions involved in marketing wheat, nor the government's attempt at regulation through the agricultural adjustment program or to improve prices through the purchase and storage of wheat have resulted in substantial success. Everyone recognizes, however, that the solution must lie either in reduced production or an increased demand, or in some compromise between the two points.

The evidence, however, indicates that there is more promise for a successful solution in the direction of increased demand rather than decreased supply. The declining demand for wheat in recent years, which was reflected in the reduced per capita consumption of flour, is the result of changes in the food habits of the nation. The declining export demand is the result of a variety of complicated factors. There is serious doubt that the United States will recapture the proportionate share of the world market which it held during the first two decades of the present century. It seems, therefore, that domestic demand is, by a process of elimination, the principal hope for any increased consumption of the domestic supply. In the stimulation of this demand, the farmer as an individual can play but a small part, although there is a greater opportunity for cooperation by wheat farmers as a group through farm organizations.

The millers, particularly those selling principally to commercial bakers, compete on a price basis where quality is determined by chemical analysis. Although aggressive merchandising can be instituted for the benefit of branded flour for home consumption, the changes in habits of living have substantially reduced the amount of home baking done by housewives. Yet there is no reason to believe that because a problem is difficult it cannot be solved. A cooperative effort of millers might start with an analysis of the demand for flour and bakery products. Further investigations might include the possibility of discovering palatable

diets which increase the consumption of wheat and flour. Another area of investigation which could be explored in cooperation with other interests in the grain trade would be the development of some type of industrial use for products of wheat. The milling industry is well organized, and by working with representatives of the baking industry even more effective progress might be made.

The difficulties confronting the millers in operating profitably are more complex. Operating on a narrow margin of profit, and with the heavy pressure of overcapacity forcing down prices, the mill operator is adversely affected by slight changes in freight rates or by changes in established shipping and milling-in-transit privileges. The industry has shifted constantly, leaving behind it the wreckage of liquidated plants.

The millers have attempted to maintain their *status quo* by maintaining prices. While some degree of control is necessary to prevent chaotic conditions in the market, it does not seem that this solution will be either effective or permanent.

While consumers' tastes are fickle and diets change, bakers could contribute to a solution to the problem of increasing demand for wheat by developing new types of bread and improving the quality of bread baked. This leadership must be assumed by the large bakers and followed through by aggressive merchandising. When food is tempting, consumers will buy it, and bakers have attempted to stimulate demand only by advertising and price with insufficient improvement in quality and taste.

The problems facing corn producers are intimately related to the problems of the livestock and meat-packing industry, which have been discussed in the chapter on that industry. There remain, however, the difficulties connected with the commercial use of corn. Although these problems affect only a small percentage of the crop and a comparatively concentrated group of producers, the solutions to the problems may affect, directly or indirectly, the entire corn crop and a majority of the producers.

The variety of products manufactured from corn by the wet-milling process indicates the potentialities of future chemical research in developing new products. It is easy to overemphasize both the possibilities and the eventual results, since it is true that even with the remarkable progress to date, the wet-milling process division of the industry is the smallest from the standpoint of volume of corn processed.

The progress which has been made in developing new industrial uses for wet-milling process corn products is encouraging for the future. As chemical research advances, there is every likelihood that additional industrial uses will be found, some of which may consume a substantial volume of corn. In the use of corn products as food, it is possible, and not unreasonable, to consider the possibility of the increased use of a satisfactory and soluble corn sugar as a substitute for imported raw cane sugar. If this possibility were realized, it would be rough justice to have another grain replace the proportion of the diet which sugar had captured from flour.

In the discovery and development of additional products which can be derived from corn, new uses may be created for that crop,—a crop which already utilizes the largest number of acres of any agricultural commodity in this country. Here demand may possibly be created in entirely new markets and in such volume, after a time, that the problems of the corn producer who can sell in commercial markets will be minimized.

The dry-milling process division of the industry does not, however, present the same potentialities as the wet-milling division. The former division produces food for human beings or animals, and as a consequence its products are subject to both substitution and competition. The decline in preference for corn meal is so great that the problem of increasing demand for dry-milled corn products is considerably greater than that of increasing the demand for wheat and flour.

The problems relating to the other grains are not so important as those relating to wheat and corn, nor will their solutions be so significant. Oats, for example, are frequently planted in rotation with wheat, and this rotation system is more important in the total production of oats than any other single factor. Since the commercial use of oats represents such a small proportion of the total consumption, there are no business problems which will affect the producer of oats to any great extent. Despite the decline in the number of horses, the total production of oats has over a period of years remained approximately the same except when affected by weather conditions.

For rye, the renaissance of the liquor industry, which now consumes one-quarter of the annual crop, has obviously created an increased demand. Imports have also increased substantially

in recent years as a result of this demand and of the very short rye crops during the drought years. Since rye can also be used for livestock feed, or ground into flour for home use or commercial sale, several alternatives are open to the rye producer in disposing of his crop. It is not expected, therefore, that any serious difficulties will occur in the near future because of problems created in the production, marketing, processing, or consumption of rye.

Barley has also benefited by the revival of the malting industry and the liquor industry. Since not all the barley produced qualifies for this use, the demand from this source does not assist those producing barley for feed. Over two-thirds of the barley produced is consumed as feed on the farm where it is grown, but with the increasing demand additional barley may move into commercial channels, and more emphasis may be placed on producing barley of malting quality.

Flaxseed may suffer to some extent from the increase in use of other vegetable oils in the paint industry, and from the change in manufacturing techniques resulting from the increased use of so-called lacquers made from cellulose. The effects of such changes, however, will first be felt in the reduced quantity of flaxseed imported. Soybean oil is not a direct substitute for linseed oil, since the former dries with a softer film. Soybean oil is being used in larger quantities in the manufacture of cheaper paints and to this extent soybean oil is competing with linseed oil. Tung oil, which is used principally in the manufacture of varnish, also does not compete directly with linseed oil, but the increased production of tung oil in the southern states may affect the consumption of linseed oil indirectly. On the other hand, since twice as much flaxseed is imported as is produced in this country, shifts in demand will not affect the domestic producer to the same extent as similar shifts would affect the producers of some of the other grains.

The rice industry of the United States is highly concentrated, and its problems do not affect wide areas; furthermore, since its only ocean shipments are to United States possessions, it does not enter into world trade to any extent. Production and per capita consumption have remained approximately the same for twenty years. Changes within the industry have created problems, however, and rice millers have been attempting to stimulate demand and increase rice consumption.

The rice-milling industry in the South is suffering from the depressing effects of a large amount of excess capacity resulting from optimistic expansion in good times. South American export markets, formerly supplied by the United States millers, have disappeared, as rice production has increased in Brazil and Argentina. The large potato crops selling at relatively low prices in recent years have also affected the rice millers, since rice competes with potatoes for a place in the consumers' diets. Rice millers complain that the public does not know how to cook rice properly and that poor preparation militates against an increase in the popularity of rice. The group most interested in educating the cooks of the country are the rice millers. A cooperative advertising and educational campaign should be the first step in a program to increase the consumption of rice.

As a general conclusion, it appears that the problems of the grain trade, from producer to consumer, are not such as to recommend wholesale abandonment of grain farms and sharp restriction of production. On the contrary, it seems that some increase in production may be necessary for grains such as rye, flaxseed, and malting barley, which are on an import basis. It is difficult for a farmer to change his crops and his methods. Concentrating on one crop for cash returns has not only become a habit, but has frequently seemed to be an economic necessity. Consequently no abrupt shifts in acreage can be expected, but some gradual change seems to be necessary.

It seems clear, however, that some responsibility for the future success of grain farmers lies in the hands of the executives who direct the activities of the grain-processing companies. Their task is to stimulate demand and create new markets for their products. To perform this task effectively something more than action by individual processors is necessary, but concerted and cooperative efforts on the part of the industries should bring returns to their individual companies as well as to grain producers.

CHAPTER VI

THE SUGAR INDUSTRIES

Despite the fact that only a quarter of the sugar consumed in the United States is produced within the 48 states, economically and politically sugar is one of the nation's most important agricultural commodities. The history of the sugar industry dates back to the early days of the republic, when a duty on sugar was imposed to provide revenue for the young and struggling government. In the latter half of the nineteenth century the beet-sugar industry was established with the blessing of a benevolent government; and in the twentieth century sugar protectionism was extended to include the tropical producers of sugar cane in Hawaii, Puerto Rico, and the Philippine Islands.

Both cane and beet sugar are grown in this country, although it is likely that the amount produced would be considerably decreased if the tariff and quotas were removed. In the continental United States, Puerto Rico, and Hawaii, raw cane sugar is produced at relatively high cost. For the most part, our beet sugar can compete with cane sugar grown in tropical areas only when the beet sugar is produced in a location so distant from tropical producing areas that freight rates are a substantial proportion of the costs of the cane sugar.

Raw sugar is not classified into the variety of types that is possible with most other agricultural commodities. On the contrary, sugar is produced by two different types of plants raised under entirely different conditions. Yet the refined product is the same. Because of this fact sugar is produced in widely separated spots on the globe.

These peculiarities of sugar have resulted in one of the distinctive characteristics of the sugar industry in this country: the fact that there are really several industries interested in sugar, and each of them has separate business, political, and, sometimes, social problems which cause a conflict of interests in the sugar industry as a whole. The continental sugar-cane producers and the

processors of raw sugar are one group, and even within this classification the problems of the Florida industry differ somewhat from those in Louisiana. The sugar-cane producers and processors in Hawaii and Puerto Rico constitute another group. The Philippine producers are another group operating under different conditions. The Cuban producers and processors must be included in the sugar industry of the United States since they receive a preferential tariff and are the largest suppliers of the American market. The domestic beet-sugar producers and processors are also a distinct group. Finally, there are the refiners of cane sugar, and within this group are included the seaboard refiners with no financial interest in offshore refineries, and those refiners who do have an interest in offshore refineries. The distinctions between all these groups must be kept clear in order to understand the ramifications of the sugar industry.

PRINCIPAL SUGAR-CANE GROWING AREAS OF THE WORLD

The principal areas producing cane sugar are India, Cuba, Java, the Philippines, Hawaii, Puerto Rico, Brazil, and Japan. Their production in recent years is shown in Exhibit 1.

EXHIBIT 1

PRINCIPAL RAW CANE SUGAR PRODUCING COUNTRIES: AVERAGE,
1925-1926 TO 1934-1935; ANNUAL, 1934-1935 TO 1937-1938
(In thousands of short tons)

Country	Average, 1925- 1926 to 1929- 1930	Average, 1930- 1931 to 1934- 1935	1934- 1935	1935- 1936	1936- 1937	1937- 1938*
United States.....	123	236	267	383	437	510
Hawaii.....	861	991	952	1,073	1,042	1,014
Puerto Rico.....	687	894	773	926	996	997
Cuba.....	5,221	2,803	2,843	2,899	3,374	3,360
Dominican Republic.....	391	439	475	504	500	504
India.....	3,341	4,909	5,757	6,611	7,523	7,355
Japan and Taiwan.....	785	1,040	1,224	1,115	1,224	1,476
Java.....	2,867	1,731	562	663	1,568	1,568
Philippines.....	819	1,170	755	1,043	1,121	1,103
Brazil.....	1,056	1,134	1,103	1,125	1,100	1,055
Australia.....	564	667	717	724	869	896
World total cane sugar....	19,684	19,223	18,769	20,919	23,780	23,905

* Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 157, pp. 126-127.

In the continental United States sugar cane is grown only in Louisiana and in Florida, by far the greater proportion being produced in Louisiana, as indicated in Exhibit 2. The yield per acre in Florida, however, is considerably greater than that in Louisiana, having averaged approximately 35 tons of cane per acre in Florida in recent years as compared with 15 to 17 tons per acre in Louisiana.

EXHIBIT 2
PRODUCTION OF SUGAR CANE IN LOUISIANA, 1919-1938, AND IN FLORIDA,
1928-1938
(In thousands of short tons)

Year	Louisiana	Florida
1919	1,883	.....
1920	2,493	.....
1921	4,181	.....
1922	3,778	.....
1923	2,387	.....
1924	1,228	.....
1925	2,644	.....
1926	864	.....
1927	962	.....
1928	1,860	13
1929	2,918	202
1930	2,559	351
1931	2,232	292
1932	2,886	421
1933	2,600	469
1934	3,019	384
1935	4,087	486
1936	4,854	565
1937	5,258	634
1938	5,859	861

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), p. 123. U. S. Department of Agriculture, *Crops and Markets* (Washington, Government Printing Office), Vol. 16, No. 4, p. 72.

The other producing areas under the American flag are more important contributors to the American market, and expansion of production has proceeded at a rapid pace during the last 10 years in most of these places. The production of beet sugar increased, Philippine cane-sugar production doubled, and production of cane sugar in Puerto Rico and Hawaii increased more gradually. The increased production in these areas since 1909-1910, as shown in Exhibit 3, took away from Cuba substantial portions of the market formerly supplied by that country.

In 1900, 35.2% of United States consumption of sugar was supplied by producers in the United States, in its territory, Hawaii, and in its possession, Puerto Rico. In 1933-1934, the peak year of production in the United States and its possessions, 75% of the consumption was supplied by producers under the American flag, and in 1935-1936, after the institution of national sugar legislation, the percentage was 69%.

EXHIBIT 3
PRODUCTION OF RAW SUGAR IN CHIEF AREAS SUPPLYING UNITED STATES, 1909-1910 TO 1937-1938
(In thousands of short tons)

Year	Continental United States		Puerto Rico	Hawaii	Philip-pine Islands	Virgin Islands	Cuba
	Cane	Beet*					
1909-1910	331.7	550.9	346.8	517.0	168.3	7.5	2,020.9
1914-1915	246.6	776.2	346.5	646.0	421.2	3.0	2,921.9
1919-1920	125.0	777.0	485.0	555.7	466.9	13.3	4,183.7
1924-1925	90.0	1,166.0	660.0	776.1	779.5	10.7	5,812.1
1929-1930	218.0	1,089.0	866.1	912.4	981.4	6.4	5,231.5
1930-1931	215.0	1,293.0	783.2	988.6	958.0	1.8	3,495.3
1931-1932	184.0	1,237.0	992.3	1,025.4	1,174.3	4.3	2,916.8
1932-1933	265.0	1,452.0	816.3	1,035.5	1,342.8	4.1	2,233.5
1933-1934	250.0	1,757.0	1,103.8	952.2	1,621.3	4.1	2,526.6
1934-1935	267.0	1,241.0	773.0	952.0	754.7	1.7	2,842.5
1935-1936	383.0	1,268.0	926.3	1,073.0	1,042.6	3.8	2,899.0
1936-1937	437.0	1,395.0	996.3	1,042.0	1,121.4	8.5	3,374.4
1937-1938†	510.0	1,376.0	996.8	1,013.6	1,103.2	8.9	3,360.0

* Converted to raw basis.

† Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), Table 149, p. 121.

Much of the expansion of United States insular production occurred after the early twenties, when Cuba, an independent republic, which at one time exported practically its entire production of sugar to the United States, was restricting production and seeking international agreements as an aid in disposing of surplus sugar.

Louisiana.—The Louisiana cane-sugar producing area, located within about a third of the state's parishes¹ and overshadowed in importance by the state's cotton production, is the oldest of the American producing areas. Until the spurt in production about 1934, expansion had not occurred to any appreciable extent for

¹ Civil divisions corresponding to counties in other states.

many years. In 1854 the sugar industry of Louisiana, already more than a century old, produced about 200,000 tons of cane sugar. During the ten-year period from 1925 to 1934 Louisiana's average annual production was slightly under 200,000 tons, or approximately $4\frac{1}{2}\%$ of this country's sugar requirements. Since 1934, however, Louisiana production has expanded, and the annual production has averaged a little less than 400,000 tons. In 1938 the crop was 491,000 tons.

Costs of sugar production are high in Louisiana, averaging 4.646 cents a pound delivered at New Orleans for the period 1929-1930 to 1931-1932, as compared with a Cuban cost of 1.923 cents a pound delivered at United States seaboard refineries.¹ One of the reasons for these higher costs is the fact that the climate of Louisiana is not entirely satisfactory for cane growing. Early frosts are constantly recurring, causing considerable damage. The growing season is much shorter there than in other cane-growing regions, and the cane must be harvested after only nine months' growth, whereas cane can be grown in a period from twelve to twenty months in the tropical and subtropical islands. In addition, the Louisiana cane does not "close in," and the fields must be cultivated to eliminate weeds, whereas in other areas the closing in of the cane effectively prevents weed growth. The additional cultivation obviously increases costs.

Cane diseases in Louisiana have added to the difficulties of the planters, particularly in 1926 and 1927 at a time when sugar prices generally were falling. By 1933, however, the introduction of new cane varieties from Java made it possible to eliminate losses from disease.²

Louisiana sugar houses, where the cane is crushed and raw sugar manufactured, are typically smaller and older than the mills in Hawaii and Puerto Rico. Organization of the industry is on a plantation system, and most of the plantation sugar houses raise some of their own sugar cane. About one-third of the cane in Louisiana is grown by processor-producer units, the remainder being raised by some 9,000 small farmers.³ Some sugar for direct consumption, called plantation granulated or refined granulated, is produced in these houses, in addition to raw sugar.

¹ U. S. Tariff Commission, Report No. 73, Second Series, *Report to the President on Sugar* (Washington, Government Printing Office, 1934), p. 14.

² Dalton, John E., *Sugar* (New York, The Macmillan Company, 1937), p. 170.

³ *Ibid.*, p. 169.

Florida.—The present Florida cane-sugar industry had its beginning in 1928. Early history of Florida sugar growing, however, dates back to the Spanish settlements; ruins of Spanish and Mission sugar houses may still be seen in northeastern Florida.

From the middle 1880's to the early 1920's spasmodic attempts were made to develop sugar-cane growing in Florida. The tropical climate is well-suited to cane culture, as is the high nitrogen content of the soil. Methods of water control, however, had to be devised before the industry could be successfully established. Today a series of canals, supervised by authority of drainage and subdrainage districts, serve as a means of transportation as well as of water control. Consulting engineers have laid the failure of early cane-growing attempts in Florida in large measure to inadequate water control.¹

As in some other areas where cane is grown on large plantations, the cultivation of sugar in Florida employs a great deal of machinery. Before planting of the cane, the fields are broken with a rotary plow. The soil is then given a resting period before it is plowed a second time and planted by machine. Cultivation of the fields during the growing season is also done mechanically.

Harvesting in Florida is done at the close of the 12-month growing season. "Ratoon"² crops are utilized in Florida, and planting is necessary only once in seven or eight years. Manual laborers with machetes cut the cane close to the ground, top it, and clear it of leaves. The cut cane is placed in wagons arranged in "trains" of five to eight wagons, each train being pulled to a loading hoist by a crawler-type tractor.

Organization of the Florida industry is on an integrated plantation basis. Over 95% of the production and processing is controlled by one company, the United States Sugar Corporation, at Clewiston, Florida.

Florida production expanded rapidly after 1929, as the figures in Exhibit 3 indicate. The Florida quota was increased in 1937, and the 1938-1939 crop was expected to be the highest on record.

The United States Sugar Corporation calculates its cost per pound of raw sugar at 2.556 cents a pound delivered at the

¹ U. S. Sugar Corporation, *Sugar in the Everglades* (New York, Benjamin H. Tyrrel Press), p. 5.

² After the newly planted cane is cut, the root structure remains in the ground and new cane shoots are sent up each year. These shoots are known as "ratoon" crops.

refinery,¹ which is a lower cost than the average for Louisiana, Hawaii, or a comparable cost for the beet-sugar areas. Florida is a small contributor to the domestic market, however, producing less than 1% of the United States requirements.

Hawaii.—The sugar industry in Hawaii, a territory of the United States, engages in all functions of the business from the growing of the cane to the distribution of the refined sugar. There are approximately 44 companies, most of which own their mills and their intraplantation transportation systems. Most of the companies cultivate their own cane land.

The agency system is peculiar to Hawaii. Six Honolulu agencies dominate companies producing 90% of all Hawaiian sugar. These agencies carry on the general administration of the companies. They are responsible for decisions and policies regarding marketing, purchasing of supplies, and financing. Except for the sugar refined in one small refinery on the island of Oahu, Hawaiian raw sugar goes to the continental United States. A large percentage of the sugar shipped from the islands is refined at Crockett, California, the remainder going to independent refineries. The Crockett refinery belongs to the California and Hawaiian Sugar Refining Corporation, Ltd., which is a cooperative organization owned by 29 Hawaiian plantations.

Captain Cook found sugar growing in the Hawaiian Islands when he discovered them in 1778, but the impetus given to the industry by its reciprocal trade treaty with the United States in 1876 started its period of rapid growth to the position it now occupies. Free admission of Hawaiian sugar into the United States was provided by the treaty. At the time this reciprocal treaty was signed, there was an attempt to send the entire Hawaiian sugar crop of 1876–1877 to Australia, to further the hope that Hawaii might one day become a British colony.² This factor is said to have hastened the signing of the treaty.

In 1837, when Hawaiian sugar shipments were first mentioned, exports were less than 2 long tons; in 1876 exports were about 12,000 long tons; in 1897, 223,000 long tons; in 1908, 465,000 long tons;³ and in 1937 shipments had increased to 861,914 long tons.⁴

¹ United States Sugar Corporation, *Fifth Annual Report*, June 30, 1936, p. 25.

² Dalton, *op. cit.*, p. 49.

³ Ellis, Lippert S., *The Tariff on Sugar* (Freeport, The Rawleigh Foundation, 1933), p. 50.

⁴ U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), p. 125.

Under these circumstances, facilities need not be so extensive for each ton of cane handled, and overhead charges may be spread over a large annual production per sugar mill. Hawaii is, however, a relatively high-cost producer. The average cost of Hawaiian sugar delivered at continental refineries from 1929-1930 to 1931-1932 was 3.286 cents compared with 1.923 cents for Cuba and 2.717 for the Philippines.¹ Consequently, Hawaii is dependent upon protection for the sale of its sugar in the United States market.

Puerto Rico.—In Puerto Rico, an insular possession of the United States, sugar cane is grown principally on a narrow border of flat coastal plain, although some cane is grown in the hill lands which are less fertile. There is adequate rainfall on the northern and eastern coasts, but in the southern part of the island irrigation facilities are required because of the lack of sufficient moisture.

Puerto Rico was ceded to the United States by Spain in 1899 after the island had been occupied by military forces of this country during the Spanish-American War. Since July, 1901, sugar shipped to the United States from Puerto Rico has been admitted duty-free, and all Puerto Rican sugar is shipped to the protected United States market. Sugar accounts for approximately half of the total exports of the island.

Puerto Rican sugar production has increased rapidly during the past few decades. Peak production of 1,104,000 short tons of raw sugar was reached in 1933-1934, but restriction of production under United States sugar legislation has decreased the total somewhat since that time. Production in 1937-1938 was 997,000 short tons.

The Philippine Islands.—The Philippine Islands, some 6,000 miles across the Pacific Ocean from San Francisco, are the most distant area prominent in supplying sugar to the United States market.

Average annual temperature in the Philippines of 78 to 80 degrees Fahrenheit is well adapted to cane growth; soils and rainfall are also favorable to the growing of cane. Typhoons and hurricanes are frequently very destructive, however. The typhoon in 1928 destroyed about 12% of the sugar crop of that year on the island of Negros.

¹ U. S. Tariff Commission, Report No. 73, p. 14.

Filipinos, Spaniards, and Americans control the sugar industry of the Philippines. It has been estimated that 35% of the total investment in the industry is in so-called "centrals,"¹ where the raw sugar is made from cane brought from a wide surrounding area. Of the capital invested in centrals 40% is American, 37% Filipino, and 22% Spanish.² Of the total investment in the sugar industry of the Philippines, an estimated 28% is American.

Sugar has been grown for centuries in the Philippines. Magellan found a sugar industry when he discovered the islands in 1521, but it was of little importance until after 1850. During the last years of Spanish rule, just before 1898 when the United States acquired the islands as a result of the Spanish-American War, the sugar industry had expanded rapidly, reaching a peak production of 261,686 tons in 1893.³ A financial crisis and unsettled conditions following the abandonment of Spanish rule caused the industry to decline radically in production. Willett and Gray's⁴ reports showed Philippine production had declined in 1903 to 34,750 long tons.

Although a 25% preferential tariff was given to Philippine exports over those of foreign countries after the United States took possession, it was not until after the Payne-Aldrich Act of 1909⁵ that the great bulk of Philippine exports went to the United States. This act allowed 300,000 tons of Philippine sugar per year to enter the United States duty-free, a quota which was considerably larger than the Philippine exports to the United States at that time. The Underwood-Simmons Act⁶ of 1913 removed the restriction on the amount of Philippine sugar which could be imported into the United States duty-free.

During the 1920's Philippine sugar production more than doubled, largely because of increased efficiency in utilizing the previously used acreage, the use of high yielding varieties, and the improvement of manufacturing efficiency by the replacement of some 1,500 to 2,000 "muscovado"⁷ mills with 36 modern

¹ The "central" or factory is the mill producing raw sugar. Cane is delivered by the growers or "colonos" to the central for grinding.

² Robertson, C. J., *World Sugar Production and Consumption* (London, John Bale, Sons & Danielsson, Ltd., 1934), p. 74.

³ Ellis, *op. cit.*, p. 54.

⁴ This statistical service publishes a weekly statement of conditions in the sugar market and statistics on the trade in sugar.

⁵ 36 Stat. 11, C. 6.

⁶ 38 Stat. 114, C. 16.

⁷ Muscovado is an inferior grade of sugar containing a considerable amount of molasses which could not be extracted by the crude methods used.

centrals.¹ Muscovado is still produced to some extent in a few of the older mills, its use being confined mainly to home consumption and exports to China and Japan.

Costs of production are relatively low in the Philippines compared with the United States continental producing areas and Hawaii and Puerto Rico, although they are higher than those in Cuba. It was estimated that the average cost of Philippine raw sugar delivered at American refineries was 2.717 cents a pound, from 1929-1930 to 1931-1932.²

Philippine production of sugar was affected by the Sugar Act of 1934, under which some \$15,000,000 in crop payments³ was made by the United States government to the producers of the islands. No payments were made in 1936, but a provision was included in the Sugar Act of 1937 whereby all taxes collected on sugars produced in the Philippines, less administrative costs, were to be returned to the government of the Commonwealth of the Philippines "for the purpose of financing a program of economic readjustment in the Philippines."⁴

Philippine independence from the United States was voted by Congress in 1934. Under the terms of the act,⁵ by 1945 the islands are to become an entirely independent nation. Some reciprocal arrangement may be worked out at that time whereby Philippine sugars, like Cuban sugars, are given some preference under the tariff, and will not be forced to bear the full duty.

As shown in Exhibit 1, during the seasons from 1925-1926 to 1929-1930 the average production figure was 819,000 short tons, which was increased to 1,170,000 short tons between 1930-1931 and 1934-1935. Philippine exports to the United States were reduced by the quota from the levels of the preceding years. The Philippine quota has approximated 980,000 short tons. The remainder of the Philippine production is consumed in the islands, much of it in a form other than refined.

Cuba.—The ties between the United States and Cuba have been strong since the Spanish-American War, and Cuban sugar has entered this country under a preferential duty since 1903.⁶

¹ Ellis, *op. cit.*, p. 57.

² U. S. Tariff Commission, Report No. 73, p. 14.

³ Dalton, *op. cit.*, p. 233.

⁴ Public No. 414, Seventy-fifth Congress, Section 503.

⁵ 48 U. S. C. 1231 ff.

⁶ Taussig, F. W., *Some Aspects of the Tariff Question*, 3d ed. (Cambridge, Harvard University Press, 1931), p. 75.

It is the largest single source of supply for sugar for the American market.

Soil and climatic conditions in Cuba favor the production of sugar cane. There are two divisions of the industry. In the western part of the island are the older, higher-cost areas owned and operated primarily by Cubans; in the eastern part are the newer, larger, and lower-cost sugar centrals owned and operated principally by American capital.

In 1934 a total of 160 sugar mills were in operation in Cuba. Americans owned 70 of these mills, 73 were owned by Cubans, 12 were owned by Canadians, and 5 were owned by both Cubans and Americans.¹ American-owned mills are the largest and most modern, and Americans own the largest tracts of cane-growing land. Over two-thirds of the sugar produced in Cuba is turned out by American-owned mills.² Most of the production of sugar cane in Cuba is by colonos, who have long-term contracts with the centrals or sugar mills.

Sugar production in Cuba in 1900-1901 was 712,000 short tons of raw sugar. By 1913-1914 the total had risen to 2,909,000 short tons. During the World War production continued to expand, since European beet-sugar production was curtailed by several million tons, supplies in Java and the Philippines were too distant, and shipping was too uncertain to aid in supplying the needs of countries in the Western Hemisphere. By 1918-1919 Cuban production had reached 4,491,000 short tons. Production remained fairly stable until 1923-1924, when it began to expand again, reaching 5,812,000 short tons in 1924-1925.

Huge surpluses began to appear on world markets at this time, with European sugar-producing countries returning to production, with increased Javan production, and with an increasing proportion of the United States market being taken by United States insular areas, which were expanding production rapidly under protection of the United States tariff. Although Cuba began in 1925-1926 to restrict sugar production, the repercussions of the sugar situation plunged the island into a state of depression and political unrest. As a consequence the Cuban government imposed further restrictions, and the output was materially decreased after 1929-1930.

¹ Foreign Policy Association, Commission on Cuban Affairs, *Problems of the New Cuba* (New York, 1935), pp. 226-227.

² *Ibid.*, p. 227.

The degree of recovery attained by the Cuban sugar industry after 1933 was almost entirely the result of the sugar policy in the United States.¹ A lowered sugar duty for Cuba, plus a quota of supplies for the United States market, raised the receipts per pound for Cuban sugar materially above those received in the depression years, and even above world-market prices.² The Cuban sugar production in 1937-1938 was 3,360,000 short tons as compared with a total of 2,234,000 short tons in 1932-1933 and the high point of 5,812,000 short tons in 1924-1925.

Java.—Java is second only to Cuba in volume of exports of sugar. The area devoted to sugar-cane production is relatively small, since the dense population requires that most of the land be used to produce other food crops. Over 97% of the cane is grown on land owned or leased by the sugar factories. The soil is cultivated intensively, and, as a consequence, the yield per acre is exceptionally high. The large population provides a more than adequate labor supply, and labor costs on the island are low.

Java has been favorably located with regard to markets for its sugar. Furthermore, the policy of the United States toward the Philippine Islands encourages the shipment of the latter's sugar to America, and diverts Philippine sugar output from its normal eastern market. As a consequence, Java was formerly in a preferred position in the Indian and other eastern markets. As a result of tariff increases, the increase in sugar production in India, and the war in China, the markets for Javanese sugar have been noticeably reduced, however, in recent years. None of the Javanese production enters the American market.

Other Producing Areas.—The raw cane sugar produced in other countries is either consumed in those countries or exported in comparatively small amounts. None of these exporting countries is important in the American market. India leads the world in the production of all types of cane sugar,³ but additional imports

¹ There seems to be no doubt that the political unrest in Cuba resulting from the severe depression of the Cuban sugar industry was a matter of grave concern to the government of this country. To improve this situation, Cuba was given a quota larger than her exports in the years immediately preceding its establishment.

² Dalton estimates that the gross income of Cuban sugar producers derived from sales made to the United States increased from an average of \$62,000,000 in the years 1931-1933 to \$113,000,000 in 1934-1937. See Dalton, John E., "Federal Sugar Control—A Four-year Review," *Harvard Business Review*, Vol. 17, No. 1, Autumn, 1938, pp. 63-75.

³ Approximately 72% of the cane produced in India is utilized in the manufacture of gur, which is unrefined concentrated cane juice of a thick consistency. This is

are required to supply the needs of the large population. Japan produces approximately 1,000,000 tons annually, principally in Formosa (Taiwan), but only small amounts are exported. The producing areas in the British Empire, including Mauritius, the British West Indies, Australia, and South Africa, export chiefly to other parts of the British Commonwealth of Nations. Other countries producing cane sugar for the world market include Peru and the Dominican Republic.

PRODUCTION OF SUGAR CANE AND RAW CANE SUGAR

Although cane and beet sugar in refined form cannot usually be differentiated by the eye or by taste, they are produced under very different conditions. Not only are they grown in different climates, for cane sugar is a tropical and subtropical product while beet sugar is produced in the temperate zones, but the whole process of growing and the technique of the manufacturing and refining processes are dissimilar in detail, although similar in general methods.

In most regions of extensive production cane sugar tends to be the dominant crop, whereas beet sugar is produced in rotation with other crops. Sugar beets are planted and harvested on an annual basis, while sugar cane, although it may be planted each year, is usually grown on a ratoon basis, whereby it is planted once in several years but crops are harvested annually or less frequently. In extracting beet sugar, factories manufacture the sugar in one plant in a continuous process, but there are usually two stages in the extraction and refining of cane sugar, the two processes often taking place thousands of miles apart.

Sugar-cane growing requires fertile soil, hot sunshine, and ample moisture. It is almost exclusively a tropical and subtropical crop. It must be grown outside the frost regions since frosts may greatly damage the crop, as they sometimes do in Louisiana.

"Sets," or pieces of cane with several joints, are planted after the ground has been prepared. Cane grown from seed is generally unsatisfactory, since it produces cane of variable quality, requires

principally a village industry, and the gur is consumed without further refining. Indian Tariff Board, *Report on the Sugar Industry* (Delhi, 1933), pp. 18-19, 43.

more delicate handling, and a longer growing season is necessary. New varieties, however, are usually developed experimentally from seeds.

The pieces of cane are planted in holes by manual labor, or in furrows if the planting is done mechanically. Soil requirements of sugar cane are ideally met by a loam, well-drained clay, or volcanic soil, with a neutral or slightly alkaline reaction.¹ The soil is usually exhausted after several years of planting, and fertilizer must be applied to maintain the yield per acre. Soils used for cane growing vary considerably. On the rich land of eastern Cuba, little in the way of cultivation is necessary before cane planting beyond the clearing of the land. In less favorable locations, or in places where the land has been used for cane for some time, preliminary cultivation, varying from machine cultivation to primitive cultivation with ox-drawn equipment, is necessary.

The sugar cane is a perennial plant, producing a mass of underground roots and stems, from which shoots will continue to appear for some years after planting. The first crop after planting, called plant cane, is harvested after a period usually extending over fifteen to twenty-four months from the date of planting, depending upon the climate and other factors. Succeeding crops, known as ratoon crops, are generally harvested after twelve months. The yield tends to decrease with each ratoon crop produced, so that the number of ratoon crops harvested depends upon the net value per acre each year of the ratoon crop as compared with the similar net value of the annual per acre average from the larger crop which could be obtained by planting new sets.

The stem of the sugar cane, which develops from a shoot, stores the food produced in the leaves in the form of sucrose. Buds developing around the joints of the sets produce the cane shoots which eventually reach a height of from 6 to 12 feet. The stem is solid, with joints at regular intervals; some varieties are a rich purple color when the cane is ripe. Stems may be from 1 to 3 inches in diameter, and there are fibrous conducting strands of thin-walled cells running lengthwise through the stem. These cells are filled with a sap in which the sucrose manufactured by the plant is stored. The cane usually consists of approximately 14% sugar, 12% fiber, 2% impurities, and 72% water.²

¹ Robertson, *op. cit.*, p. 10.

² Fairrie, Geoffrey, *Sugar* (Liverpool, Fairrie and Company, Limited, 1925), p. 12.

Moisture is very important during the period of greatest growth of the cane plant. Drought at this time results in shorter and thinner canes, which contain relatively more fiber and less juice and require additional power in the cane-crushing operation. Moisture requirements of the sugar cane are met by most tropical areas with well-marked alternations of wet and dry seasons, although irrigation is resorted to in Hawaii, Java, Puerto Rico, West Mauritius, and South Jamaica.

Cane sets are usually planted near the end of a wet season in order to get the plant established before the dry season, during which growth ceases. During the next wet season, the major part of the plant's growth occurs, and maturity comes with the succeeding dry season. In areas of artificial irrigation water is withheld to permit the cane to ripen.

During cane maturity, in the dry season, the leaves wither, growth is checked, the cane ripens, and the sucrose content of the cane is increased. Excessive moisture at this period results in dilution of the sucrose-bearing juice, sprouting of buds, formation of roots which cause the cane to lose sucrose by inversion,¹ and increased susceptibility to cane diseases. In regions where a rainy season usually follows the ripening season, the cane must be cut before the rains begin, for growth recommences, and ground conditions make transport to the factory impracticable.

Coolness during the ripening season, which checks growth and allows concentration of the energy of the cane plant in storing sucrose, brings increased yields of sugar. This is illustrated by the relatively high sugar content of the cane grown in the elevated districts in Java, Mauritius, and Natal.

Violent winds are a problem in some of the cane-growing regions. The canes are shallow-rooted, and lateral budding of the fallen cane injures the juice. Twisting and breaking of the cane result in fermentation at the broken joints, and often rind disease sets in. It may be noted, however, that in these regions cane is relatively less injured than alternative crops which might be grown.

Of the numerous varieties of sugar cane in cultivation, there are two general groups,² the *tropical* and the *North Indian*. The

¹ Inversion is the breakdown of sucrose, a disaccharid, into dextrose or levulose, which are monosaccharids. Sucrose crystallizes very easily, whereas it is extremely difficult to crystallize the monosaccharids. Inversion occurs when disaccharids are dissolved in water and heated in the presence of a small amount of acid.

² Robertson, *op. cit.*, p. 5.

tropical variety, believed to have had its beginnings in New Guinea or Polynesia from a species kin to the wild cane, is most commonly grown. The North Indian class, the best-known variety of which is Uba, is grown especially in Natal. This class is more resistant to unfavorable climatic conditions and to disease, but has smaller unit yields of cane, less sugar juice, and more fiber and adherent leaves. Much of the increase in production of sugar during the present century has been a result of the increase in sugar yield brought about by the use of improved varieties of cane. Between 1919 and 1930, chiefly because of the development of a new variety of cane known as P.O.J. 2878, the production of sugar per acre in Java increased 50%.¹

The growing of sugar cane is primarily under the control of large companies owning the sugar mills or manufacturing plants where the raw sugar is extracted from the sugar cane. These companies either control the cane lands, which may be owned or leased, and supervise the production of the cane themselves, or they contract with a number of small producers for their supply. Companies operating their own plantations are found principally in Java and Hawaii, where an established class of farmers able to maintain the required scientific standard of cultivation is lacking.² A small part of the Cuban crop is produced on company-owned property. In the Philippines and in Puerto Rico the amount of land which can be owned by a corporation is now limited by law.

At the present time the minimum price which the sugar mills must pay to the cane growers, or colonos, is set by the governments in Cuba, the Philippines, Puerto Rico, and Hawaii.³ The terms of the labor contracts between the colonos and their labor are also set by the governments. Moreover, production is controlled by government action.

The sugar mills contract with the colonos for the production of a certain amount of cane, and advances are made to the colonos

¹ Ellis, *op. cit.*, p. 14.

² Rowe, John W. F., *Markets and Men* (New York, The Macmillan Company, 1936), p. 78.

³ In Cuba and Puerto Rico the growers, known as colonos, may own their own land or lease it from the mill. In Cuba the colono may be paid in sugar and dispose of it through a wholesale merchant. In Puerto Rico the mill does not give the sugar to the colono but sells it and pays him either on the basis of the weight of the cane or of the sucrose recovered. In the Philippines the mills charge the grower at a certain rate, usually paid in sugar, and the balance of the sugar is returned to the grower for sale to a cooperative or through an agency. In Hawaii very little cane is produced by independent growers.

before the cane is cut. Payment for the cane is based on sugar content and the prevailing price for sugar. During the growing season the agricultural practices of the colonos are supervised by a representative of the central, or sugar mill.

Before the mature sugar cane is harvested, the field is sometimes burned over to remove the leaves of the cane and trash. The area burned is usually the equivalent of one day's cutting. The burning does not damage the cane itself, but it must be milled within three days after burning or the juice will deteriorate.

Harvesting of sugar cane is typically a manual operation, being accomplished by hand cutting with large knives. A great deal of labor obviously is involved in the process, particularly for the purpose of completing the harvest rapidly in order to keep the mill running as near to capacity as possible, day and night, through the harvesting season. Furthermore, inversion of the sucrose in the cane occurs if the interval between maturity and cutting is too long.

Large investments in tractors, trucks, and railway equipment including engines, cane cars, permanent and portable track, or flumes, are necessary on many of the large plantations to transport the cane to the sugar mills after cutting. Some of the railway equipment is also used to transport materials in the planting, cultivating, and fertilizing of the crop. Oxen are frequently used rather than tractors on the smaller cane-growing units in some places.

Mechanical harvesting of cane has not been practicable until recently. A new Falkiner cane harvester tried on a large scale in Florida in 1931 cut the cane, if reasonably straight, at the rate of 20 tons an hour for each machine, and also cut twisted cane on wet ground successfully.¹ As yet, however, the machines have not been used extensively as a substitute for manual labor, particularly because the cane stalk in most producing areas tends to curve along the ground before shooting upward, making mechanical cutting exceedingly difficult.

Two types of cane-cutting machines have been the subjects of experiments in Hawaii.² One is a revolving-knife type, and the other involves a grab system which bites the cane off just below the soil. The grab cutter could also be used to load cane and was

¹ Robertson, *op. cit.*, p. 13.

² *Facts about Sugar*, Vol. 32, No. 9, September, 1937, p. 351.

used on several plantations to harvest cane in the fall of 1937.¹ Cane-loading machines are now in general use in Hawaii, where an adequate labor supply is a problem to the sugar industry.

New problems, however, are introduced by the greatly increased amount of trash and dirt going into the sugar mills when the cane is cut by machine. Mechanical loaders had already emphasized this problem, but machine cutting increased the difficulties. Many technologists are convinced that the solution lies in the installation of washers or other cane-cleaning equipment, and several such installations have already been made. Settling capacity in many Hawaiian mills, however, was crowded even before the mechanical harvesting equipment aggravated the situation.

The different growing areas show wide variations in the yield per acre, some of which are caused by the length of the growing period and some by the variations in the use of irrigation. In the Philippines and in Louisiana, the average yield of sugar cane in short tons an acre has been between 15 and 20, as compared with approximately 25 in Puerto Rico, 30 to 35 in Florida, and from 60 to 70 in Hawaii.² Variations are also found between different sections in any one area.

Large investments of capital are required to produce raw sugar. The United States Sugar Corporation in Florida, for example, has placed a valuation of over \$3,400,000 on its lands, and a net value of \$2,096,000 on buildings, machinery, and equipment, out of total assets of \$7,734,000. Half the total \$15,306,000 of assets of the Fajardo Sugar Company of Puerto Rico are in property and plant. Other companies producing sugar cane show figures of similar proportions. The principal operating expenses are for the growing, harvesting, and transportation costs. The net cost of operating the sugar factory amounts to only 12% to 15% of the cost of raw sugar.

Capacity in large cane-sugar mills is about 4,000 tons of cane daily. With a normal daily output of approximately 2 to 3½ tons for a man cutting cane with a machete or cutlass, a seasonal labor supply of from 1,100 to 2,000 men would be needed to supply the cane for a mill of this size.³ These workers cut off the

¹ *Ibid.*, Vol. 32, No. 10, October, 1937, p. 411.

² U. S. Department of Agriculture, Bureau of Agricultural Economics, *The World Sugar Situation, 1937* (Washington, October, 1937), pp. 30-33.

³ The average acreage harvested to supply one large central during the cutting season is from 10,000 to 20,000 acres.

cane at the base of the stalk, and also remove the top and leaves if they have not been burned off.

The cane is hauled by a locomotive from the fields to the sugar mill¹ where it is weighed and then unloaded mechanically on a conveyer. This conveyer carries it to the crusher, which shatters the cane and prepares it for further pressing. This crushing action is accomplished by passing the cane, which contains from 85% to 90% of juice, through a series of rollers. The juice is drawn off, and the residue of crushed cane, called bagasse, is either used for fuel or is sometimes sold for further processing to make building material. Hot water is added during the pressing operations to dilute the residual juice in the bagasse as a further aid to extraction.

The juice flowing from the mills is pumped to tanks to be weighed, and lime is added until the solution is neutral. The juice is then quickly heated almost to the boiling point and passed into settling tanks, or clarifiers. The clear liquor, known as clarified juice, is pumped to the evaporators, and the sludge, or settlings, is filtered to extract as much sugar as possible. In the evaporators, the juice is concentrated to a thick syrup by heating, and is then pumped to the vacuum pans, where the syrup is boiled at low temperatures under vacuum until it begins to crystallize.² The mixture of crystals and syrup which results, known as magma, is then separated in centrifugal machines. The syrup is forced through a revolving basket of wire mesh and the sugar crystals are left within the basket, from which they are discharged when a valve at the bottom of the basket is opened. The crystals are bagged and the liquid, or molasses, is reconcentrated to extract as much as possible of the sugar remaining in the mixture.

The raw sugar produced by the mill is brown in color and contains 96% to 98% sucrose. This sugar is then shipped to the refineries for further processing and for the removal of color and impurities.

The operation of sugar mills for raw sugar production near the plantations is made expensive by the fact that in most places operation is limited to a few months in the year. In Cuba in recent years, including some years before restriction of production

¹ On some of the Hawaiian plantations the cane is transported to the mill by flume.

² The vacuum pan permits the boiling of the syrup at a temperature of around 150 degrees Fahrenheit. Higher boiling temperatures would result in discoloration of the crystals.

began, the longest average duration of factory operation was 156 days.¹ Factories work night and day during the peak of the harvesting season. The large bulk and weight of the cut cane make it imperative that the cane-sugar factories be located near the growing fields.

Modern facilities in sugar mills have displaced gradually the primitive crushing and extracting equipment formerly used. Today there is less cane juice left in the cane fiber residue, or bagasse, and less sugar left in the molasses, than formerly. There are, of course, a few mills still using crude and primitive methods and others using varying degrees of improved technique and equipment. The Hawaiian sugar industry was industrialized at an early date; Cuba was modernized before the World War, and further industrialization by American capital took place in the 1920's; Philippine production was likewise greatly improved during the 1923-1931 period, and production in that area increased 243% with only a slight increase of acreage under cane cultivation.²

DOMESTIC REFINING OF CANE SUGAR

Most cane-sugar factories located near or in the growing areas produce a raw sugar of 96 to 98 degrees polarization.³ This sugar is brownish in color, coarse-grained, and moist. Although "direct consumption sugars"⁴ of over 99 degrees polarization can be produced by carrying the purification of the juice somewhat further in the raw sugar mill, the usual process is to complete the refining process in another factory. The sugar refinery must operate throughout the year to be economical, whereas the raw sugar mill operates only while the cane is being harvested. Furthermore, the costs of transportation of refined sugar from the producing areas to the centers of consumption are more than the transportation costs for raw sugar. In addition, much of the

¹ Robertson, *op. cit.*, p. 14.

² Dalton, *op. cit.*, p. 51.

³ This term indicates the percentage of sucrose or pure sugar which can be crystallized. This quality can be determined by examining a sugar solution through a polariscope or saccharimeter. By means of a beam of light which is passed through a fixed and a rotating prism of this instrument the sucrose content can be measured. The maximum saccharine strength is 100 degrees.

⁴ Direct consumption sugars of this type are bleached and washed raw sugar. Since filters are not used, the sugar is not so white as the refined sugars and tends to lump because of the relatively greater amount of moisture. For these reasons, such sugar is not commercially acceptable.

refined sugar imported from offshore areas must be reground before use, since it tends to form lumps in transit.

The United States receives from offshore producers the largest proportion of its raw cane sugars, which are then refined in this country by the seaboard refiners. New York, San Francisco, Philadelphia, Baltimore, Savannah, New Orleans, and Boston are the refining centers in the United States.

When the sacks of raw sugar reach the United States, the sugar is tested by United States customs officials at the refinery dock. The tests for raw sugar grades now in use are those made by the polariscope. During 1937 the New York Sugar Trade Laboratory polarized 16,552 samples of sugar imported at Atlantic and Gulf ports. Average polarization was 97.12 degrees. Tests gave Philippine sugars an average polarization of 97.40 degrees; Puerto Rican, 97.00 degrees; and Cuban, 96.78 degrees.¹ Polariscope tests are also the basis for taxes levied on sugar, either the tariff duty at ports of entry or the processing or excise tax.

Before the polariscope method of testing sugar was used, the Dutch standard was applied. This system used the color of the sugar as a basis for judging its value. The Dutch first devised the system for use in connection with Javan sugar, and every year they distributed standard grades in hermetically sealed glass bottles. Some countries still use this basis for tariff levies. The United States in 1861 provided for a differentiation between raw and refined sugars on the basis of Dutch standard classifications. It was found, however, that color alone was not a very reliable basis for determining sugar value, and numerous abuses were corrected by the adoption of the polarization test. The same color of sugar made by two different methods might vary from 70 or 80 degrees up to 96 or 98 degrees of saccharine strength by polariscope test.²

The refining process is somewhat similar to that in the raw sugar mills, except, of course, that there is no grinding operation. The raw sugar is washed in hot water in centrifugal machines which remove impurities. After this operation the sugar has a purity of 99.2 degrees. The melting process follows; this involves the addition of hot water to dissolve the sugar. The resulting

¹ *Lamborn's Sugar Statistical Bulletin* (New York, Lamborn & Co., Inc.), Mar. 22, 1938, p. 64.

² Wells, David A., *The Sugar Industry of the United States and the Tariff* (New York, privately printed, 1878), pp. 42-43.

mixture has a density of 66% of solid matter. Lime is added and also kieselguhr (diatomaceous earth), to act as a filtering agent for mechanical filtration. Further purification, for removing solubles, takes place through bone charcoal filtration.¹ The resultant liquid is boiled in vacuum pans until sufficiently crystallized and then spun in a centrifugal machine, which separates the crystals from the liquor.

The crystals are dried and turned out as granulated sugar; variations in the refining processes produce brown (or soft) sugars. Every effort is made to extract sugar from any residue that remains from the refining process. Even the bags in which the raw sugar was shipped are carefully washed and the water processed to secure any sugar remaining in the solution.

About 107 pounds of raw sugar of 96 degrees polarization are required to produce 100 pounds of refined sugar,² though some of the loss is recovered as by-product molasses.

The granulated sugar may be sold as such, or further processed into loaf, powdered, and other forms of hard sugar. Special dry or liquid sugars are also prepared by refiners for the various food industries, such as the fruit canners, bakers, candy manufacturers, and others.³ Beet sugar is not offered in so many varieties as is refined cane sugar, and is sold principally as standard granulated sugar.

PRODUCTION OF BEET SUGAR

Sugar beets, a product of temperate climates, are of more recent commercial importance than sugar cane. Technological improvements in extracting more sugar from the beets, in processing the sugar juices, in selecting and breeding beet varieties, and in irrigation and cultivation methods have encouraged rapid development of the beet-sugar industry. Since sugar beets can be grown in cooler climates, their production has also been encouraged in the self-sufficiency programs of various countries.

Europe produces 90% of the world's total supply of beet sugar, and North America 10%. Exhibit 4 shows that the Union of Soviet Socialist Republics, Great Britain, France, and the

¹ Some refineries, including the Sucrest Corporation in Brooklyn and most of the tropical refineries, use vegetable carbons rather than bone char as a filtering agent.

² The raw sugar would have a potential content of 107×96 or 102.72 pounds of refined sugar.

³ One refiner now produces 62 types of sugar and 277 different types of packaging. *Facts about Sugar*, Vol. 33, No. 7, July, 1938, p. 31.

United States have increased their beet-sugar production since 1930, while production has decreased in Czechoslovakia¹ and Poland. Germany has recovered from her low production level in 1932 to a point where her 1937-1938 production exceeded the 1925-1926 to 1929-1930 average.

EXHIBIT 4

PRINCIPAL BEET-SUGAR PRODUCING COUNTRIES: AVERAGE, 1925-1926 TO 1929-1930 AND 1930-1931 TO 1934-1935; ANNUAL, 1934-1935 TO 1937-1938

(In thousands of short tons, raw basis)

Country	Average, Average,		1934- 1935	1935- 1936	1936- 1937	1937- 1938*
	1925- 1926 to 1929- 1930	1930- 1931 to 1934- 1935				
United States.....	1,066	1,396	1,241	1,268	1,395	1,376
Great Britain.....	202	498	724	585	650	510
France.....	879	1,112	1,291	977	960	1,034
Germany.....	1,937	1,838	1,844	1,845	1,810	2,330
Czechoslovakia.....	1,301	825	708	631	801	818
Poland.....	745	546	492	490	505	620
Union of Soviet Socialist Re- publics.....	1,148	1,371	1,547	2,239	2,203	2,800
Estimated World Total Beet Sugar.....	9,488	9,979	10,486	10,687	10,998	12,096

* Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), p. 126.

Sugar is said to have been first extracted from the beet root in 1797 by Achard.² At that time the sugar content of the beet juice was just over 3%. By 1868 the Germans had bred plants with a sugar content of over 10%; today sugar content is 14% to 20%, while in some tests the Rimpan strain has averaged 21%.³

The sugar beet is a perennial, but its cultivation for sugar purposes is on an annual basis. During the first year it stores sugar in the enlarged tuber composed of the tap root and hypocotyl. If the beet remains in the ground, the second year is given over mainly to seeding.

¹ Czechoslovakia lost approximately 20% of its producing capacity when much of its territory was acquired by other countries in the fall of 1938. There were 15 factories and 2 refineries in the Sudeten area acquired by Germany. *Facts about Sugar*, Vol. 33, No. 11, November, 1938, p. 30.

² Robertson, *op. cit.*, p. 17.

³ *Ibid.*

THE SUGAR INDUSTRIES



Organization of the beet-sugar industry is centered about the manufacturing units, which make arrangements with growers before the planting season for the sale of the beet crop. Sugar-beet factories are typically large in size, and in the United States the extraction of sugar from the beet and all the refining processes are done in one factory in a continuous process, as contrasted with the usual method of processing of cane sugar, by which the raw sugar is produced in one place and the refined sugar in another.

Beet-sugar manufacturers typically supply seeds to growers and assist them in securing extra labor during the thinning and harvesting seasons. Growers, in return, contract to plant an agreed-upon acreage in sugar beets, and to deliver them to a specified loading point or to the sugar factory. The sales price of sugar beets to the factory is set by the sucrose content of the beets and by the market price of sugar during the year following the processing of the beets.¹ Sometimes a minimum price is guaranteed by the factories to the growers in the contract signed before planting, although this practice resulted in heavy losses for some beet companies in 1930, 1931, and 1932. The contracts are signed to assure an outlet to the growers and to assure a supply to the processors, since the beets cannot be transported any great distance without deterioration.

The fruit of the beet plant contains an average of about six seeds. After this seed ball is planted and the plants begin to grow, several young sprouts appear. These must be "singled" or thinned to remove from each bunch all but the best sprout. The thinning operation is very important, as carelessness or thinning at the wrong time may greatly reduce the yield. Mechanical blocking to eliminate some of the bunches by drawing a cultivator at right angles across the rows has been recommended as the best preparation for singling.² After blocking, the singling is done by hand.

Three main types of sugar beet have evolved from breeding: tonnage or high-yield types, intermediate types, and sugar or high-sucrose types.³ The yield-type beet plants require a relatively

¹ The f.o.b. "beet net" is the price from which the growers' return is calculated. This is the average net return to the beet processor for each 100 pounds of sugar sold during the crop year. Malott, Deane W., *Problems in Agricultural Marketing* (New York, McGraw-Hill Book Company, Inc., 1938), pp. 325-331.

² California Agricultural Extension Service Circular 95, *Sugar-Beet Production in California* (Berkeley, January, 1936), pp. 37-41.

³ U. S. Department of Agriculture, Circular No. 476, *Evaluation of Sugar-beet Types in Certain Sugar-beet Growing Districts in the United States* (Washington, July, 1938), pp. 2-3.

long growing season and warm, dry soils. On the basis of tonnage of beets they are the most prolific of the three types. Their greater tonnage in relation to the amount of sugar content, however, requires more labor, brings higher transport costs, and results in higher handling costs in the factory. This type of beet, however, yields more by-products.

Sugar-type beet plants mature earlier than yield-type varieties, and are for this reason suited to regions with relatively short growing seasons, with cold and wet climates, with heavy soils, or with expensive labor. In recent tests the yield type produced more sugar per acre than either the intermediate or sugar type.¹

The cultivation of beet seeds is a specialized job, as seeds from commercial beets are not satisfactory for planting. Although formerly beet seeds were secured primarily from Kleinwanzleben, in Saxony, the Bureau of Plant Industry has developed some disease-resistant varieties which are now grown in large quantities in Arizona, California, New Mexico, and Utah. Much of the seed required for the sugar-beet areas of the West is grown in these states.

Shape is an important consideration in the breeding of sugar beets, since this characteristic affects the ease of lifting and topping the beets and the ease of handling in the factory. Disease resistance is indirectly affected by shape.

Soil for beet growing is prepared by deep plowing and by disk harrowing. Frequently the farmer "floats" the field by drawing heavy timbers across the soil to level it. In some irrigated areas beets are planted on ridges of two rows each, with a trough in between for irrigation. Additional tilling is done before and after singling, but as soon as the tops of the beets enlarge, weed growth is effectively checked.

Ideal rainfall distribution involves a period of moderate rainfall for the preparation of the seedbed and for germination, followed by abundant rainfall during the period of greatest growth, a period of diminishing rainfall, and lastly a month of dry weather which would increase the sugar content and facilitate the lifting and hauling of the beets. The best conditions actually available are brought about by moderate rainfall. Excessive moisture makes cultivation more difficult, causes fangy roots, and if it occurs in the latter part of the season, lowers the sugar content

¹ U. S. Department of Agriculture, Circular No. 476, p. 26.

of the beets. Excessive moisture also increases the spread of disease, particularly the development of a fungus causing leaf spot, one of the principal sugar-beet diseases. Drought decreases tonnage, encourages root rot, and also is conducive to propagation of the white fly or leaf-hopper, the principal sugar-beet insect pest, which spreads the curly top disease. In the principal beet-growing areas, in the western part of the United States, sugar beets receive moisture by irrigation.

In general, five frost-free months are required for beet cultivation. Frosts are damaging during germination, and later cold spells lower the quality of the crop. Moderate temperatures during the middle period of development are most beneficial, and cool temperatures during maturity aid in achieving high sugar content.

Sugar beets are grown in rotation with other crops, including alfalfa, corn, potatoes, and grains. Usually the sugar beets are fertilized more intensively than the other crops used in the rotation system, in order to increase the yield. Sugar beets, with their abundant foliage, aid in smothering weeds and in breaking up the soil and adding to its organic content with their many roots. Consequently, other crops grown after a crop of sugar beets usually show higher yields than they otherwise would.¹

Sugar beets are harvested after the beet-sugar factory chemist has reported on the sucrose content. In the intermountain region, the beets must be removed from the ground before the middle of October. The beets must first be "lifted," a process in which the soil is loosened and the beets are moved nearer the surface. The lifting is done by a special lifting plow, or by a beet puller. After lifting, the laborers remove the beets from the ground, top the beets by removing the leaves and the crown of the beet, and throw them in piles to be later hauled to the factory. Apparently the beets lose weight if they are not topped immediately after lifting.² The speed with which the beets must be removed from the ground when ripe necessitates a large labor force. It has been estimated that there were in 1933 a total of 159,000 hired laborers who worked to produce the crop.³ Of this

¹ California Agricultural Extension Service Circular 95, pp. 5-6.

² Utah Agricultural Experiment Station Circular No. 93, *Better Sugar Beet Culture for Utah* (Logan, April, 1931), pp. 28-29.

³ U. S. Works Progress Administration, Studies of Changing Techniques and Employment in Agriculture, Report No. A-1, *Sugar Beets* (Philadelphia, August, 1937), p. 40.

number, it was estimated that 110,000 were contract workers. In the western states of this country this work is done by migrating laborers who depart after the harvest. At one time the processors secured the labor for the beet growers, and they still maintain labor departments to advise the farmers.

Sugar-beet factories in the United States usually reserve the right to reject beets with a sugar content of less than 12%, and they ordinarily provide a premium for beets with a higher sugar content if prices are such that the difference is significant. The cost of beets is the major cost item in the production of sugar from beets, averaging approximately half of the total cost of the beet sugar at the factory door.¹

The manufacturing process in a beet-sugar factory consists of cutting the beets into thin slices, which are treated with warm water to extract the juice. Concentration of the beet liquor is accomplished in much the same manner as in cane-sugar manufacture. Refined sugar is produced in the beet manufacturing plants of the United States and Great Britain, but most factories in Czechoslovakia, Germany, and the Netherlands follow the practice of manufacturing raw beet sugar in one plant and refining it in another. These European refining plants are in many cases also equipped to process cane sugar. The savings effected by doing away with remelting and handling costs when refined beet sugar is produced in a continuous process have been generally recognized. European refining interests with plants already established have assured by agreements the continuation of the two-factory refining of beet sugar.

A beet-sugar factory requires a large supply of pure water; a unit which handles 1,000 tons of beets daily generally uses 4,000,000 to 5,000,000 gallons of water a day.² It is also necessary to have water to carry away the large amount of effluent which results from the operation of the plant.

Good transportation facilities are necessary for a beet-sugar factory because the raw materials used, as well as the sugar and by-products manufactured, are bulky.

Coal consumption is an important item in factories, amounting to 10% to 12% of the weight of the beets,³ and limestone is used

¹ U. S. Cane Sugar Refiners Association, *Sugar Economics, Statistics, and Documents* (New York, 1938), pp. 36-37.

² Robertson, *op. cit.*, p. 22.

³ *Ibid.*, p. 22.

extensively in the purification of the juice. After clarification, the juice is filtered, evaporated, concentrated to crystallization, centrifuged, and granulated. Approximately 95% of the sucrose in beet molasses can be recovered.¹ Raw beet sugar has a disagreeable taste; consequently, only refined beet sugar is consumed by human beings. The unpalatable beet molasses finally discarded is mixed with pulp to make an extensively used cattle feed. Tops are also used to feed livestock, and a large lamb-feeding industry has developed in Colorado to utilize the by-products of the sugar beet.

UNITED STATES BEET-SUGAR INDUSTRY

The United States beet-sugar industry was of negligible importance until after 1900. Rapid growth occurred after the turn of the century, and the beginnings of the industry were aided by the bounty, amounting to 2 cents a pound, which was paid on domestically produced sugar from April 1, 1891, to August, 1894, under the arrangement made in connection with the Tariff Act of 1890,² which removed the tariff on sugar for a period of four years. The individual states also offered financial encouragement to beet growers and manufacturers. Idaho, Kansas, Minnesota, Michigan, Nebraska, and New York offered bounties to growers and manufacturers, and Iowa exempted the property of sugar manufacturers from taxation.³

In 1906 about 10% of the domestic sugar requirements of the United States were met by our continental beet-sugar industry, and today the beet-sugar industry supplies about 20% of the sugar consumption of the United States. The production of sugar beets and of beet sugar in the United States since 1913 is shown in Exhibit 5.

Sugar beets are produced by over 70,000 small independent farmers in the United States, who sell their crop under contract to about 90 beet-sugar factories, controlled by some 27 companies. Cooperatives are important principally in the setting of rates under which beet growers are paid for their crop. There were 16 beet growers' cooperative bargaining associations in 1935 repre-

¹ Fairrie, *op. cit.*, p. 203. Such a high proportion of sucrose cannot be recovered from cane molasses because of the high proportion of uncrystallizable sugars which interfere with the filtering process.

² 26 Stat. 567, C. 1244.

³ U. S. Federal Trade Commission, *Report on the Beet Sugar Industry in the United States* (Washington, Government Printing Office, 1917), pp. 14-15.

senting a quarter of all the growers.¹ A national federation of these local cooperatives, the National Beet Growers Association, was organized in 1930. Another interest of this association is in proposed legislation affecting the beet-sugar industry, since such legislation frequently has had a direct effect on sugar prices.

EXHIBIT 5
UNITED STATES PRODUCTION OF SUGAR BEETS AND BEET SUGAR,
1913 TO 1938

Year	Production of sugar beets (in thousands of short tons)	Production of beet sugar (chiefly refined) (in thousands of short tons)
1913	5,886	733
1914	5,585	722
1915	6,511	874
1916	6,228	821
1917	5,980	765
1918	5,949	761
1919	6,421	726
1920	8,538	1,089
1921	7,782	1,020
1922	5,183	675
1923	7,006	881
1924	7,508	1,090
1925	7,381	913
1926	7,223	897
1927	7,753	1,093
1928	7,101	1,061
1929	7,315	1,018
1930	9,199	1,208
1931	7,903	1,156
1932	9,070	1,357
1933	11,030	1,642
1934	7,519	1,160
1935	7,908	1,185
1936	9,028	1,304
1937	8,784	1,288
1938	11,614	1,685

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), p. 118, and U. S. Department of Agriculture, *Crops and Markets*, Vol. 16, No. 4, April, 1939, p. 72.

In Michigan, Ohio, Wisconsin, and other central states, large numbers of Polish and Bohemian families from the large cities work in the beet sections during the thinning and harvesting seasons. Most of the thinning in California and Utah beet fields is

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, *Cooperative Marketing of Agricultural Products*, by Ward W. Fetrow (Washington, February, 1936), p. 103.

done by Mexicans, although a few Filipinos and Japanese are used.¹ Mexicans are also used for thinning and harvesting, as far north as Montana. Many communities find the influx of these workers during the growing season undesirable, and the apparent necessity of employing such labor in the beet fields tends to retard the growth of the industry in some areas.

The principal reason for the growth of the American beet-sugar industry has been the tariff. The location of the industry also gives it preferential treatment in all markets near beet-sugar producing areas except California, because transportation costs of refined cane sugar from the seaboard are relatively high. All the cane-sugar refineries are on the Gulf, Atlantic, or Pacific coasts, and because of the weight of sugar, freight charges to inland points are high compared with the actual price of sugar. In addition, the United States Department of Agriculture has for many years fostered the growth of the domestic beet-sugar industry, through research and improvement projects and through the distribution of educational pamphlets to the growers. By 1915, continental beet producers were second only to cane producers in Cuba in the size of their contribution to the United States sugar supply.

The peak production of beet sugar in the United States came in 1933, when 1,642,000 short tons were processed. Expansion of the sugar-beet industry continued, therefore, through the late depression period, even when prices of sugar fell considerably. Prices of alternative crops which might have been raised on the land fell even farther, and farmers turned more and more to the production of more sugar beets, for which there was a ready market. This turn of events greatly aided the beet-processing plants in maintaining their gross income during the depression. Yield per acre and beet-sugar production in the principal states producing sugar beets are shown in Exhibit 6.

The direction of the beet-sugar industry has been westward. Colorado has long been the most important sugar-beet producing state. California has increased its production of sugar beets from an average of 783,000 short tons during the period 1920-1924 to 1,975,000 short tons in 1936 and 1,723,000 short tons in 1937. The production of beet sugar in that state has increased correspond-

¹ California Agricultural Extension Service Circular 95, p. 34, and Utah Agricultural Experiment Station Circular No. 93, p. 5.

ingly, as may be seen in Exhibit 6. Montana, Idaho, and Wyoming have also shown increased production over the period.

The western climate, with cool nights and abundant daytime sunshine, is well suited to sugar-beet production. Irrigation financed by the Federal government and others has opened up lands in the Rocky Mountain area for the production of sugar beets. Yields are better in the western irrigated areas than in the nonirrigated central states.

EXHIBIT 6
YIELD PER ACRE OF SUGAR BEETS AND PRODUCTION OF BEET SUGAR IN
PRINCIPAL STATES: AVERAGE, 1927-1936; ANNUAL, 1937 AND 1938

State	Sugar-beet yield per acre (in short tons)			Beet-sugar production* (in thousands of short tons)		
	Average, 1927- 1936	1937	1938	Average, 1927- 1936	1937	1938
Ohio.....	8.7	5.8	7.2	31	14	43
Michigan.....	7.7	7.2	8.2	110	79	171
Nebraska.....	12.2	14.0	14.4	120	113	135
Montana.....	11.5	12.2	12.7	82	122	142
Idaho.....	11.0	12.1	15.8	75	99	143
Wyoming.....	11.6	13.0	12.9	81	94	106
Colorado.....	12.3	12.4	14.6	347	303	309
Utah.....	12.2	12.4	15.7	87	81	111
California.....	12.5	12.9	13.1	187	288	337
Other states.....	8.5	10.1	11.0	97	95	188
Total United States.....	11.0	11.6	12.5	1,218	1,288	1,685

* Includes some sugar manufactured from beets and beet molasses originating in other states.
Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 16, No. 4, April, 1939, p. 72.

Lack of adequate chemical control in the early beet-sugar processing plants resulted in a sugar inferior in quality to that refined from cane. Today, however, there is no recognizable difference between cane and beet sugars. Beet sugar typically sells at a price slightly below cane sugar because the beet-sugar producers have no large line of sugars including cubes, yellows, browns, confectioner's, and other specialized types. In a city such as Denver or Salt Lake City, however, the price of beet sugar is the price of sugar, since, because of freight costs, there is no competition from cane sugars.

The United States beet-sugar industry is not so important in our national economy as are the beet industries in such countries as Germany and Czechoslovakia, which not only supply the needs of the domestic markets, but, with the aid of export bounties, produce a surplus for export. On the other hand, the beet-sugar industry is very important politically, and because of its concentration is important economically in communities depending upon this crop for their principal income.

The geographical location of the beet-sugar industry is also of great importance politically, as Dalton has pointed out.¹ The sparsely populated states in the Rocky Mountain area have as large and as vociferous representation in the Senate as the more heavily populated and industrialized states of the East and Middle West. The representatives of middle western states producing beet sugar make up a substantial group in the lower House. These representatives have an excellent argument for the protection of this industry, since sugar is an agricultural commodity which can be produced in this country and which is imported in large quantities. Consequently the beet-sugar growers and processors have fared well at the hands of the government.

CONSUMPTION OF SUGAR

Consumption of sugar varies with the standard of living in the various countries; the annual per capita consumption of sugar is a

EXHIBIT 7
WORLD CONSUMPTION OF RAW SUGAR, 1926-1938
(In long tons)

Year	Consumption	Year	Consumption
1926	25,004,712	1933	23,864,501
1927	23,067,701	1934	25,393,752
1928	23,639,153	1935	26,870,268
1929	25,564,233	1936	28,146,326
1930	24,824,195	1937	29,308,986
1931	25,904,849	1938	29,491,209
1932	24,296,906		

Source: *Weekly Statistical Sugar Trade Journal* (New York, Willett and Gray), April 20, 1939.

little more than 100 pounds in the United States, slightly more in the United Kingdom, 55 pounds in France, 17 pounds in Italy,

¹ Dalton, *op. cit.*, p. 149.

5 pounds in China, and about 30 pounds for the world.¹ The countries where prices are relatively low, as in the United Kingdom and the United States, typically have a higher per capita consumption than those countries such as France and Italy where the price has been more than double that of the first two countries.

EXHIBIT 8
SUGAR CONSUMPTION IN THE UNITED STATES, 1866 TO 1936-1937
(In terms of raw sugar)

Year	Consumption* (in thousands of pounds)	Per capita consumption* (in pounds)
1866	880,010	24.4
1876	1,811,270	39.2
1886	3,125,276	53.4
1896	5,598,392	78.3
1906	7,094,496	81.9
1916-1917	8,438,132	83.2
1926-1927	13,426,716	114.4
1927-1928	12,313,554	103.4
1928-1929	13,910,310	115.3
1929-1930	13,180,308	107.6
1930-1931	12,876,744	104.1
1931-1932	13,358,224	107.2
1932-1933	12,729,406	101.5
1933-1934	12,435,124	98.5
1934-1935	13,360,392	105.1
1935-1936	13,780,358	107.6
1936-1937	13,304,422	103.2

* These data indicate the amount available for consumption calculated from existing stocks, production, imports, and shipments from possessions less exports and stocks at the end of the year.

Source: U. S. Department of Agriculture, *Yearbook of Agriculture, 1924* (Washington, Government Printing Office, 1924), p. 802; U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), p. 124.

World consumption since 1935 has exceeded the previous peak reached in 1931, as shown in Exhibit 7. Of course, total consumption increases with the annual increase in population, but the peaks and depressions in the business cycle have been important in recent years in determining the annual consumption of sugar.

The greatly increased consumption of sugar in the United States over the period of years shown in Exhibit 8 has come about not only because of increased population, but also because of an increased per capita consumption of sugar. The consumption in 1937 of 103.2 pounds per capita is over four times as much as the consumption in 1866. The high point per capita consumption of

¹ U. S. Cane Sugar Refiners Association, *op. cit.*, Table 2, p. 3.

115.3 pounds was reached in 1928-1929. Although business conditions and other factors obscure the trend, Professor Schultz believes that since 1922 per capita purchases of sugar have been reduced by an average of 0.42 pound per capita.¹ This decrease can probably be attributed partly to the weight-reducing diets which have been adopted by many people, by the increasing use of corn syrups and sugars in the manufacture of confectionery and bakery products, and by the increased consumption of fresh fruits.

Comparative figures for 1936 and 1937 contributors to the United States sugar supply are shown in Exhibit 9.

EXHIBIT 9
SOURCE OF THE SUGAR SUPPLY OF THE UNITED STATES IN 1936 AND 1937
(Raw value)

Source	1936	1937
Sugar distributed in the United States (short tons) . .	6,706,218	6,674,690
United States cane refiners	66.4%	69.5%
United States beet processors	20.5	18.6
Importers of direct consumption sugar (cane)	10.9	9.5
Continental United States cane-sugar mills in Florida and Louisiana	2.2	2.4

Source: *Lamborn's Sugar Statistical Bulletin*, Feb. 15, 1938, p. 38.

The United States is the largest consumer of sugar in the world. The greatest consumers of sugar in Europe are the United Kingdom, Germany, and France.

RAW SUGAR MARKETS

The principal market for spot raw sugar in this country is in New York. There is no organized market or trading place, since buyers, sellers, and number of sales are relatively few. The quantity bought and sold in each transaction is large, however, and competition is keen, since the price of the raw sugar is such a large proportion of the price of the refined sugar. The refined sugar prices follow the raw sugar prices closely. Consequently, the refineries compete largely on a price basis.

The sales of raw sugar are reported by two services, Willett and Gray and Lamborn & Co., which also report offering prices for sugar not yet sold. Sugar is quoted on a c.i.f. basis for full-duty

¹ Schultz, Henry, *The Theory and Measurement of Demand* (Chicago, University of Chicago Press, 1938), p. 232.

sugars, a cost-and-freight basis for Cuban sugars, and a duty-paid basis for world sugars as well as Philippine and Puerto Rican sugars.

London is also an important raw sugar market. Both spot and futures contracts are bought and sold on the London market.

Raw sugar futures contracts have been traded in on the New York Coffee and Sugar Exchange since 1914. The unit of trading is 50 long tons. The raw sugar must be bagged and be of 96 degrees average polarization to be deliverable on this contract. The active trading months are January, March, May, July, September, and December. Because of the duty and quotas the delivery contracts are somewhat more complicated than on other futures exchanges. One contract, No. 3, is used for trading in domestic sugars which are within the authorized quotas of the United States. Prices for this contract, therefore, represent futures prices for sugars delivered in the United States. Contract No. 4 is a world sugar contract; its price is the world price, and sugar delivered under this contract is for consumption outside the United States.

RAW SUGAR PRICES

Because of the individual nature of most sugar transactions, price quotations on sugar do not always reflect the actual situation in the market. The terms of sale and delivery of a specific transaction may not be comparable with other transactions. For example, a contract for the sale of sugar to be delivered at the refinery door in 60 days, with no guarantee against price declines, would normally be made at a price lower than prevailing quotations. Furthermore, at times an additional complication is the fact that the volume of sugar sold at different price levels varies considerably, and quotations are purely nominal. The yearly averages shown in Exhibit 10, however, indicate the level and trend of sugar prices during recent years. The average wholesale raw sugar price, for sugar delivered at New York before the payment of duty, is a satisfactory price series over a period, since the duty has changed several times during recent years. The retail price for sugar moves slowly, principally because of the large volume of stocks and advance purchases made by wholesalers and retailers which must be moved out before any wholesale price change is effective in the retail markets.

Government control of the industry either by quotas or by tariffs has always had an important influence on the price of sugar in the United States. The duty is a protective barrier, and for many years effectively lifted the American price above the world price. With the establishment of quotas a new element entered the price structure, and because of the very limited amount of free-duty sugars now permitted to enter the market, it appears that the duty is not so effective as the quotas in the determination of

EXHIBIT 10

SUGAR PRICES: WHOLESAL E PRICES FOR 96 DEGREE CENTRIFUGAL RAW SUGAR AT NEW YORK, AND RETAIL PRICES FOR GRANULATED REFINED SUGAR (UNITED STATES AVERAGE), 1927-1937

Year	Raw sugar average whole-sale,* cost and freight, New York (cents per pound)	Retail granulated refined sugar (cents per pound)
1927	2.948	7.3
1928	2.434	7.1
1929	1.993	6.6
1930	1.471	6.2
1931	1.333	5.7
1932	0.930	5.1
1933	1.220	5.4
1934	1.500	5.6
1935	2.331	5.7
1936	2.694	5.6
1937	2.543	5.6

* Does not include duty.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), pp. 129-130.

the prevailing differentials between prices for sugar in the United States and in the world markets. The effect of the quota on prices can better be considered after the operations of the quota system have been discussed.¹

MARKETING OF SUGAR BY REFINERS

Refined sugar, whether beet or cane, is sold mostly on "movements," rather than on a regular day-to-day or week-to-week basis. A movement takes place usually when a change in price is announced, although the announcement of a lower price will not necessarily start a movement. In the latter case buyers may buy

¹ See pp. 345 et seq.

on a hand-to-mouth basis if they believe that prices will continue to fall, or stocks purchased on a previous movement may be adequate until an attractive price is announced.

When higher prices are posted, the sales during the movement which usually follows are made at the old lower prices prevailing up until the time of the price rise. No sales, in fact, may ever be made at the higher posted price.¹

Movements in the refined sugar market are usually from thirty to sixty days apart, and during the intervals between movements very little sugar is sold. The current inventory and financial condition of refiners determine how much they will participate in a movement, and buyers determine their commitments in relation to market conditions and the state of their own inventories.

Freight rates are important in setting sugar prices in given markets. The refiner with the lowest freight costs between his refinery and the market tends to set the price on a delivered basis in the market. Any other refiners who wish to sell in that market are forced to absorb the difference between their freight costs and his. Changes in freight rates, brought about in places where rail freight has been reduced substantially to compete with water transportation, tend to upset the normal trading areas of the various refiners.

Various forms of price guarantees to purchasers have been made by refiners. An interesting type of agreement is the four-payment plan. Originally introduced to enable small buyers to buy in carload lots and save in freight, this plan was demanded by large buyers. It involves paying for each quarter of the shipment or contract at the lower of either the price current in the market on the day when the payment falls due, or the price as of the date of the original order. Another form of price guarantee lies in giving the buyer the privilege of canceling contracts for future delivery in case of a drop in the price of sugar.

¹ A chart of refiners' announced prices, submitted as Exhibit 0-3 in *U. S. v. The Sugar Institute, Inc.*, 56 S. Ct. 629, shows the movements for the year 1931. There were a total of 20 movements during this year, principally because of unsettled prices. A typical note of explanation of one movement was as follows: "On June 18 American announced an advance from 4.45 (cents per pound) to 4.55, effective June 20. This was followed by Arbuckle, Pennsylvania, Western, Revere, Godchaux, McCahan, and Henderson. C & H announced the advance, but also announced a decline to 4.40 effective June 18. This was followed by all refiners, those who had announced the advance announcing the decline first." The American Sugar Refining Company, *Annual Report*, 1935, pp. 66 *et seq.*

Early in 1938 certain of the terms of sale for sugar were revised by the refiners. All varieties of the four-payment and deferred-payment plans and all types of price guarantees were withdrawn by most cane and beet refiners in the United States.¹ Provision was also made for strict enforcement of shipment or delivery within the thirty-day period of a contract. Transit time, a time-honored plan whereby buyers could elect to take delivery from warehouse stocks and extend their terms of payment to include the theoretical time required for shipment to them from the refinery, was withdrawn.

Terms under the revised plan were 2% cash ten days from arrival or delivery from consignment. Contracts under the new plan called for shipment or delivery within thirty days, except for the Pacific Coast, where the twenty-one-day rule remained in effect.

Later in 1938 all these privileges were again restored. Competition among the refiners for a share in the market apparently was sufficient to compel some of them to make concessions, and soon the old methods of sale were resumed by all the refiners.

The contract for the delivery of sugar which the refiner sells also includes differentials to be paid for the assortment of sugars if a full line is sold. The terms, freight charges, and differentials result in variations in the price on specific contracts while the quoted price for refined sugar is unchanged.

PRINCIPAL COMPANIES IN THE INDUSTRY

The principal groups in the sugar industry in the mainland United States include the beet-sugar processing and refining companies, the companies growing and processing cane in Louisiana and Florida, and the domestic refiners of raw cane sugar.

In the beet-sugar industry the principal companies may be defined as those receiving an annual allotment of production from the Secretary of Agriculture of over 1,000,000 bags of 100 pounds each. The marketing quotas for these companies in 1934 and 1935 were as shown in Exhibit 11.

The *Great Western Sugar Company* is the largest producer of beet sugar in the United States. The company has 13 factories in Colorado, one in Montana, six in Nebraska, and two in Wyoming. The annual capacity of these plants is 10,800,000 bags.

¹ *Lamborn's Sugar Statistical Bulletin*, Feb. 1, 1938, p. 23.

The Johnstown, Colorado, plant is the only beet-sugar factory in the world operating over the full year in extracting sugar from beet molasses. This molasses is shipped from the other factories of the company after they have finished their operating season. Assets of the company approximate \$80,000,000.

EXHIBIT II
SUGAR QUOTA ALLOTTED TO PRINCIPAL BEET-SUGAR COMPANIES, 1934
AND 1935
(In 100-pound bags of beet sugar)

Company*	1934	1935
Amalgamated Sugar Company.....	1,989,544	1,761,287
American Crystal Sugar Company.....	2,892,159	2,501,232
Great Western Sugar Company.....	9,594,284	8,393,433
Holly Sugar Corporation.....	3,863,859	4,492,808
Michigan Sugar Company.....	1,399,232	1,523,367
Spreckels Sugar Company.....	2,184,406	3,244,399
Utah-Idaho Sugar Company.....	2,844,031	2,605,527
Total allotment in continental United States beet sugar.....	28,650,892	28,971,963

* The only important company not included in this list is the Great Lakes Sugar Corporation, which received an allotment of approximately half a million bags in 1934 and 791,734 bags in 1935.
Source: U. S. Department of Agriculture, *Continental United States Beet Sugar Orders*.

The *Holly Sugar Corporation* is the second largest company in the beet-sugar industry, owning 11 plants in Colorado, Wyoming, California, and Montana, with a total annual capacity of 4,300,000 bags.

The *American Crystal Sugar Company*, formerly the American Beet Sugar Company, owns 10 factories which are located in California, Colorado, Iowa, Nebraska, Minnesota, and Montana. These factories have an annual capacity of 4,187,000 bags of sugar. The company owns extensive areas of beet-sugar land in Colorado and California, upon which a large proportion of its requirements are grown.

The *Utah-Idaho Sugar Company*, which has been established since 1889, now has a total of two active and five inactive plants in Utah, four in Idaho, one in Washington, and three in South Dakota. The average total production of these plants is over 2,500,000 bags annually.

The *Spreckels Sugar Company* was one of the early pioneers in the beet-sugar industry. The company owns three factories,

all located in California. The American Sugar Refining Company owns 50% of the stock of this company.

The *Amalgamated Sugar Company* operates six factories, two in Utah, three in Idaho, and one constructed in 1937 in Oregon. The annual capacity of the six plants is approximately 3,200,000 bags of 100 pounds each. In 1936 the company exchanged two plants, located in California and Montana, for the stock of a concern which was previously owned by the American Crystal Sugar Company. The Amalgamated Sugar Company had a deficit on its balance sheet for the four years preceding 1934, and paid dividends on its preferred stock in 1937 for the first time in ten years.

The *Michigan Sugar Company* is the largest beet-sugar company operating in the North Central states, owning eight plants in Michigan with an annual capacity of 2,000,000 bags. The American Sugar Refining Company owns 26% of the capital stock of the Michigan Sugar Company.

Other than *Godchaux Sugars, Inc.*, the companies operating in Louisiana to produce raw cane sugar are relatively small. Godchaux has a large refinery with a daily melting capacity of 2,000,000 pounds at Reserve, Louisiana; this refinery processes Cuban, Puerto Rican, and Philippine raw sugars as well as those produced in the company's two sugar factories. The company owns 31,000 acres of land, of which 13,700 are under cultivation. The *South Coast Corporation* owns over 40,000 acres of land in Louisiana with 21,000 acres in cultivation, and operates three sugar mills with a combined daily grinding capacity of 5,000 tons of cane. The company also operates a small refinery in Matthews, Louisiana. *Sterling Sugars, Inc.*, owns 11,500 acres of land, of which 5,000 are cultivated. The company also buys cane from near-by plantations. A small refinery with a daily melting capacity of 700,000 pounds is operated by this company at Franklin, Louisiana.

There are only two companies operating in Florida, the *United States Sugar Corporation* and the *Fellsmere Sugar Corporation*. The former company produces over 90% of the cane grown in Florida, and ships its raw sugar to Savannah, Georgia, for refining under a contract with the Savannah Sugar Refining Corporation. The cane is grown in southern Florida, principally on lands reclaimed from the Everglades.

There are 15 important companies engaged in the refining of raw cane sugar in this country. All the plants are located on or near the seaboard.

The *American Sugar Refining Company* is the largest and most important factor in the refining industry, the capacity of its five refineries representing approximately 30% of the total capacity of the cane-sugar refining industry in this country. These refineries are located at Baltimore, Boston, Brooklyn, Chalmette (Louisiana), and Philadelphia. Two of the largest sugar factories in Cuba are owned by this company, and over 300,000 acres of Cuban land are under its control. The company sells under the Domino and Franklin brands. In addition to its beet-sugar interests mentioned above, the company also owns 25% of the stock of the National Sugar Refining Company.

The *National Sugar Refining Company* owns two large refineries, one in New Jersey and one on Long Island. It is the industry's second largest unit, producing approximately 13% of the total output of the American cane-sugar refining industry. Jack Frost is the brand name for this company's product.

The *California & Hawaiian Sugar Refining Corporation, Ltd.*, has the country's largest sugar-refining plant, located at Crockett, California. This company is a cooperative, owned by 29 Hawaiian sugar-producing companies for the purpose of refining their raw sugar and of marketing it under the C and H brand.

The *Pennsylvania Sugar Company* operates a large refinery at Philadelphia, the *Western Sugar Refining Company* (a Spreckels interest) operates a refinery at San Francisco, and the *Revere Sugar Refining Company*, a subsidiary of the United Fruit Company, has a large refinery at Boston. This latter company brings the raw sugar produced on its own plantations to Boston in open cargo rather than in sacks. Other important refiners include *Arbuckle Brothers*, located in Brooklyn, the first to introduce packaged coffee and sugar; *W. J. McCahan Sugar Refining & Molasses Company*, located in Philadelphia; *Godchaux Sugars, Inc.*, of New Orleans; *Savannah Sugar Refining Corporation*; *Imperial Sugar Company*, of Texas; *Sucrest Corporation*, of Brooklyn (a subsidiary of the American Molasses Company); *Colonial Sugars, Inc.*, of New Orleans (a subsidiary of the Cuban American Sugar Company, which owns a refinery in Cuba); and the *Henderson Sugar Refinery*, of New Orleans.

The Sugar Institute was formed by 13 of these refineries. The Western Sugar Refinery and the California & Hawaiian Sugar Refining Corporation, Ltd., were added to the group in 1929 and 1930. The industry was principally concerned in preventing secret rebates and concessions and in stabilizing prices. To avoid conflict with antitrust laws, the plan of operation was submitted to the Department of Justice and approved in principle. After its establishment in 1927 the Institute conducted a national advertising campaign to increase the consumption of sugars.

In 1931, after a change in personnel in the Department of Justice, the Federal Government filed suit against the Sugar Institute for alleged violations of the Sherman Antitrust Act. The principal attack was on the basis of certain statistics collected which were available to members but not to the entire sugar trade, certain classifications of brokers and warehouses which were alleged to be discriminatory, and certain phases of the price-reporting and pricing policies which were followed. The United States Supreme Court enjoined the Institute from these activities in a decision handed down in March, 1936.¹ Later in the year the Institute was dissolved.

While the Sugar Institute case was passing through the courts, the refiners had been meeting informally to represent the industry at Congressional hearings on tariffs and on the sugar control acts, and to propose to the government plans for stabilizing the industry.

Relations with the United States Government are important in the domestic sugar-refining business. Tariffs at various rates have been levied upon both raw and refined sugar imports. The government controlled the industry during the World War; and, under the Sugar Act of 1934, set up a quota system and processing tax which was first revoked but later reinstated in the Sugar Act of 1937. One hundred ninety-nine bills relating to sugar were introduced into the United States Congress between 1919 and 1935, and most of these affected the refiners.²

In the tariff of 1930 the traditional differential in favor of domestic refined sugar was omitted,³ and the way in which the

¹ *Sugar Institute, Inc., et al. v. United States*, 56 S. Ct. 629.

² The American Sugar Refining Company, *Annual Report*, 1935, pp. 23-26.

³ This omission was apparently not deliberately designed to hurt the domestic refiners, but was left out because of a misunderstanding in the complexities of detail written into the act, and in the rush to pass it before adjournment of Congress. Despite the complaints and pleas of the refiners to the President and to the Tariff Commission, the differential was not restored. According to one of the Tariff

levies were made created a small differential of 2 cents a 100-pound bag in favor of imported refined sugar as against imported raw sugar. At the same time shipments of refined sugar from Hawaii, Puerto Rico, and the Philippines increased. In addition, large users of granulated sugar such as the Hershey Corporation, owning raw-sugar factories in Cuba, were able to import refined rather than raw sugars. For this reason Hershey built a refinery in Cuba to supply the needs of that company. As a result of these conditions, imports of refined sugar increased from 286,000 long tons in 1929 to 627,000 long tons in 1933. The Sugar Act of 1934 set quotas for this refined sugar as well as for raw sugar, but refiners complained that the refined sugar which came in free of duty from Puerto Rico and the Philippines was unfair competition to the domestic industry.¹ The refiners made the point that they were the only section of the sugar industry having no tariff protection.

This view was not shared by the Administration, however, and before the Sugar Act of 1937 was passed, President Roosevelt and Secretary Wallace were eager to remove the quotas on refined sugar. After considerable controversy these quotas were continued until 1940.

Following the Supreme Court decision regarding the Sugar Institute, 11 of the companies formed the United States Cane Sugar Refiners' Association as a central organization for research in sugar and to present the views of the industry on impending legislation. The California & Hawaiian Sugar Refining Corporation, Ltd., Colonial Sugars, Inc., and the Sucrest Corporation did not join the new group. This association, like other associations representing the various sugar groups, was quite active in Washington while the Sugar Act of 1937 was under consideration. The spokesman for the refiners stated that the industry was willing to cooperate in the development of sugar legislation for the benefit of producers in continental United States, Hawaii, Puerto Rico, the Philippines, and Cuba. On the other hand, the refiners stated that they would oppose any sugar legislation which would give quotas on raw sugar and would not give quotas on refined sugar. They argued that tropical sugar producers, already receiving benefits of higher prices and cash subsidies on their raw sugar,

Commissioners the differential was not restored because the complications of securing accurate cost figures for the offshore refineries would make any recommendation subject to criticism.

¹ See annual reports of The American Sugar Refining Company for 1934 and 1935.

should not be permitted to expand their refining operations. This point of view was also taken by Congress in the provisions of the bill. Although the bill was signed by President Roosevelt, he made it plain that he was dissatisfied. In a public statement made when the bill was signed, the President announced: "I am approving the bill with what amounts to a gentleman's agreement that the unholy alliance between the cane and beet growers, on the one hand, and the seaboard refining monopoly, on the other, has been terminated by the growers. . . . I hope that the next session of Congress will consider repealing or shortening the clauses which continue the refining monopoly to March 1, 1940."¹ No new sugar legislation was passed by Congress in 1938.

EXHIBIT 12

INTERNATIONAL TRADE IN SUGAR: AVERAGE, 1925-1929, 1930-1934;
ANNUAL, 1935 AND 1936
(In short tons)

Principal Countries	Average, 1925-1929	Average, 1930-1934	1935	1936
Exports:				
Cuba.....	5,032,658	2,911,526	2,680,798	†
Netherlands Indies.....	2,380,762	1,672,683	1,138,706	974,489
Czechoslovakia.....	792,566	381,607	216,294	211,185
Philippines.....	612,260	1,046,077	569,043	991,892
Dominican Republic.....	353,915	383,422	549,132	479,288
Peru.....	332,668	369,999	358,724	358,851
Mauritius.....	242,199	214,838	257,059	307,776
Imports:				
United States†.....	4,428,566	3,102,806	2,954,988	2,969,297
United Kingdom.....	2,135,293	2,266,067	2,198,681	2,532,159
British India.....	904,568	555,898	251,596	42,090
China.....	823,225||	495,504	287,357	175,049
Manchuria.....	†	113,029§	118,448	246,465
Canada.....	524,446	441,572	450,377	520,511
France.....	460,753	435,730	403,361	345,790
Japan.....	414,134	158,690	154,889	238,109

* Preliminary.

† Not available.

‡ Includes imports from Philippines but does not include shipments from Hawaii and Puerto Rico.

|| Including Manchuria.

§ Three-year average.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1938* (Washington, Government Printing Office, 1938), pp. 130-131.

INTERNATIONAL TRADE IN SUGAR

Statistics on the flow of international trade in sugar by principal exporting and importing countries are given in Exhibit 12.

¹ *The New York Times*, Sept. 2, 1937, p. 1.

The largest cane-sugar producer, India, consumes practically its entire output at home. Cuba, on the other hand, produces almost entirely for export. The Netherlands East Indies, including Java and Madura, export substantial amounts of cane sugar. The Philippine Islands are also important in export trade. The United States is by far the largest sugar importer, followed in importance by the United Kingdom, Canada, and France.

International trade in sugar for each of the years 1933, 1934, and 1935 was considerably below the 1925-1929 average. Since world consumption was increasing during these years, it appears that economic self-sufficiency was being practiced by many countries. Production in importing countries as a whole reached a record high total of 18,533,000 tons in 1936-1937.¹ This total is approximately 1,600,000 tons more than importing countries produced in the preceding season, indicating that the sharp upward trend of production of beet and cane sugar in these countries is continuing.²

NATIONAL AND INTERNATIONAL GOVERNMENT ACTIVITIES AFFECTING THE SUGAR INDUSTRY

Although all the sugar consumed in the United States is produced in areas or countries closely tied to this country, the sugar industry is affected not only by the activities and controls of the United States Government but also to some degree by the individual activities of other important sugar-exporting and -importing countries. The collective action of these countries through international agreements also affects the business policies of the sugar companies operating in this country and the farmers who produce the raw material. The thread of government control runs through the entire fabric of the world sugar industry. This control has been exerted through tariffs, domestic bounties in various countries, restriction of production, restriction of exports, quota systems, and, during the World War, complete control of the industry and the purchase of the entire Cuban crop by one authority. To achieve an adequate understanding of the present national and international situation in sugar, therefore, it is necessary to trace the development of present controls and to review past experience.

¹ U. S. Department of Agriculture, Bureau of Agricultural Economics, *Foreign Crops and Markets*, Oct. 9, 1937, p. 232.

² *Commercial and Financial Chronicle*, Oct. 16, 1937, p. 2469.

Tariffs have been a part of governmental policy the world over for some time. Since the close of the World War, however, the trend toward economic nationalism has been accentuated, further barriers have been put in the way of free international trade, and every major sugar producing and importing country has adopted some plan of sugar control. These restrictions have been extremely serious in such areas as Cuba and Java, which depend upon the export market as an outlet for a large percentage of their production.

Cuba receives preferential treatment in the United States market by virtue of a lower tariff rate and a quota. The Cuban quota is larger than the amount exported to this country in the early 1930's, when Cuba had the protection of a preferential tariff alone. Cuba has not fared so well in the world markets where her sugar has had to compete with home production of the various importing countries as well as with the sugar of other exporters. Consequently, Cuban production has been restricted sharply since 1930.

The problem of nationalism in sugar is not new, however. As early as 1830 a system of more or less disguised bounties was instituted to encourage the beet-sugar industry on the European continent. Export bounties and subsidies led to numerous complaints of dumping of beet sugar on world markets.

A conference in Brussels in 1898, composed of representatives from various European countries, attempted unsuccessfully to reach some agreement to discontinue the beet-sugar bounties. Another conference in the same city in 1901-1902 finally resulted in the signing of the Brussels Convention on March 5, 1902. The agreement, which prohibited bounties on the production and exportation of sugar, was to be effective September 1, 1903. The threat of a British boycott on bounty-produced sugar was the motivating force in getting the signatures to the convention. Representatives of Germany, Austria, Belgium, Spain, France, Great Britain, Italy, the Netherlands, Sweden, and Norway signed for their respective nations. During the World War period several signatories withdrew, and the convention was finally terminated in 1920.

Between 1789 and 1890 the United States tariff on sugar was primarily a tariff for revenue. Until 1890 the United States tariff on raw sugar of 2 cents a pound provided a substantial

revenue, since 85% to 90% of all sugar consumed in the United States was imported from Cuba and other foreign countries.¹ In 1877, out of a total customs revenue of \$128,223,207, about 30% or \$37,080,819, was derived from duties on raw sugars, cane juice, and molasses.²

In 1890 the duty on raw sugar was removed in favor of a 2-cent bounty paid directly to domestic sugar producers. Cuban sugar growers were aided by this move, at the expense of the Hawaiian growers, who suffered severe depreciation of their properties because their market advantage in the United States had been gained through a reciprocal treaty in 1876. The bounty also gave a tremendous impetus to the beet-sugar industry in the United States, even though the differential was the same as the tariff. Many new factories were established. Apparently the cash payment was more attractive than the protection of the tariff.³

In 1894 a sugar tariff of 40% ad valorem was established in the United States, and the bounty was abolished. In 1897 the tariff was set at 1.685 cents per pound; in 1914 it was reduced to 1.26 cents per pound. In 1902 Cuban sugar received a 20% tariff preferential under the terms of a reciprocal trade treaty, and within the next decade Cuban sugar became the sole important foreign source of United States sugar.

After the acquisition of the Philippines and Puerto Rico, the United States tariff system favored sugar production in the Philippines and Puerto Rico. The opening of the American market to these two areas, along with the duty-free entry privilege extended to Hawaiian sugar in 1876, laid the foundation for vast increases in cane-sugar production in those areas.

From the turn of the present century until the outbreak of the World War, supply and demand conditions in the sugar markets were fairly well balanced, and sugar prices remained relatively stable. The coming of the World War, however, upset this balance. The beet-sugar production in Europe was curtailed radically, and the increased production of cane sugar in Cuba and Java was not adequate to replace output from the areas temporarily out of production.

¹ Dalton, *op. cit.*, p. 21.

² Wells, *op. cit.*, p. 9.

³ Taussig, *op. cit.*, p. 80.

Even under these conditions the sugar supplies of the world might have proved adequate had not the wartime shipping shortage developed. The United States, the United Kingdom, and Canada, requiring in total about 5,223,000 short tons of sugar, ordinarily transported 85% of their sugar requirements by vessel.¹ Since the boat trip to Java for sugar supplies took three times as long as the trip to Cuba, the restricted shipping facilities required that as much as possible of the Allied requirements be secured from Cuba and the United States. The Allied Powers had formerly received much of their sugar supply from the Central Powers, with whom they were then at war, and as beet fields became battlefields, the necessity of securing increasing amounts of sugar from the Western Hemisphere became an essential war measure.

As a consequence, exports of refined sugar from the United States increased from 30,963 short tons in 1912 to 302,642 tons in 1914, 882,864 tons in 1915, and 676,753 tons in 1916.²

By 1917 the Cuban-American exportable sugar surplus was only 800,000 tons above the prewar average. The United Kingdom alone received 1,100,000 tons of sugar imports annually from the Central Powers before the war.³ France and Italy also required sugar from the West. Thus, there was rather spirited bidding for the Cuban sugar supply during the war years. The British Royal Commission on the Sugar Supply acted as purchasing agent for Great Britain, France, and Italy.

An insurrection in Cuba in 1917, however, materially reduced the year's Cuban sugar crop. In that same year the United States entered the war, and on August 10 Herbert Hoover took office as United States Food Administrator. The United States War Trade Board assumed control of the sugar exports, and trade with other than Allied countries was discontinued; trading on the New York Coffee and Sugar Exchange was also suspended.

The United States Food Control Acts,⁴ a wartime emergency measure, had not given the government power to buy or sell sugar,

¹ Bernhardt, Joshua, *Government Control of the Sugar Industry in the United States* (New York, The Macmillan Company, 1920), p. 4.

² The figures are raw value, but the sugar exported was chiefly refined. U. S. Department of Agriculture, *Yearbook of Agriculture, 1925* (Washington, Government Printing Office, 1926), Table 406, p. 1001.

³ Bernhardt, *op. cit.*, p. 7.

⁴ 40 Stat. 273, C. 52; 40 Stat. 276, C. 53.

nor to fix its price. Control of sugar, therefore, had to be accomplished on a voluntary basis. Agreements to lower sugar prices were made between the United States sugar producers and the government.

An authority known as the Allies' International Sugar Committee of Five purchased in December, 1917, the entire Cuban sugar crop of 1917-1918 at \$4.60 per 100 pounds, f.o.b. northern Cuba ports. Of this purchase, one-third was to go to the British Royal Commission for use in Europe, and the remaining two-thirds was to go to refineries in the United States. Special executive machinery was set up to allocate sugar to American refineries, to regulate shipments of sugar to foreign countries, and to handle all details of the Cuban transactions. In addition, a Central Distributing Agency had been set up in September, 1917, to distribute all beet sugar produced in the United States.

There had been some difficulty in handling sugars from various producing areas with different costs of production. To set the market price high enough to satisfy domestic producers, it would have been necessary to overpay Cuban producers. Consequently, the United States Sugar Equalization Board, Inc., was incorporated in Delaware on July 11, 1918, to deal in foreign sugar and to control the domestic distribution of sugar.

Sugar consumption was very closely controlled. Allotments were made to manufacturers of other than essential food products, manufacturers of nonedible products were to receive no sugar, and even households were rationed, first on the basis of 2 pounds a person each month and later at the rate of 3 pounds a person a month. Certificates were issued to consumers to be exchanged when sugar was purchased.

In October, 1918, the United States Sugar Equalization Board, Inc., concluded an agreement with cane-sugar refiners, by which refiners were to buy sugar only from the Board. The Board had previously negotiated to purchase all the 1919 Cuban sugar crop. A percentage basis for allocation of sugar to the various refiners was fixed in the agreement.

At the beginning of 1919, world supply and demand seemed to favor removal of consumption restrictions on sugar, but an abnormal demand developed after June. Some restrictions on shipments of sugar in the North Atlantic region were made in order to insure a sugar supply for the East, but on January 26,

1919, all remaining special regulations governing manufacturers and refiners of sugar were annulled, and after that date manufacturers and refiners were subject only to provisions of the Food Control Act and to their contracts with the Food Administration and the Equalization Board.¹ Exports of sugar were allowed in 1919 to a limited extent. After February, however, the War Trade Board required licenses for export trade, and all export transactions were made subject to approval of the Sugar Equalization Board.

The sugar industry of the United States was in a relatively stable position during the first part of 1919 in relation to other industries in this country. Raw and refined sugar prices and refiners' margins were fixed, and an adequate supply of raw sugar appeared to be in prospect.

During the second half of the year, however, the problem of supplies became acute. Total consumption of sugar had increased; there had been a considerable decrease in production in the world beet-sugar industry, and sugar could be shipped freely throughout the world to those areas suffering from shortages during the war. Prices had not changed during this period of abnormal demand because of the controls exercised by the Sugar Equalization Board. The Board proposed that the 1920 Cuban crop be purchased to assure an adequate supply to protect consumers. No such action had been taken, however, when the Board's control over the industry expired December 31, 1919, and President Wilson refused to authorize the continuation of the Board.

Trading in sugar futures on the New York Coffee and Sugar Exchange was restored on February 16, 1920, under rules providing for maximum daily fluctuations of 1 cent per pound from the previous day's closing quotations, and a maximum of 1 cent per pound between the high and low prices for any one day.² By the first of March, 1920, the sugar industry was freed from government control, except for that which was authorized by the Lever Act,³ and which was enforced on all food industries by the Attorney General.

With the removal of restrictions upon prices, the unusual demand at that time drove prices to a high of 20.8 cents a pound

¹ Bernhardt, *op. cit.*, p. 78.

² *Ibid.*, p. 123.

³ Another food control act passed in 1919. 41 Stat. 297, C. 80.

for raw sugar in May, 1920. At that point there was a sharp break, and the price fell to 5.3 cents per pound by December, 1920. Such conditions naturally created financial chaos in Cuba, which had been expanding production during the profitable war years when supplies of European beet sugar were curtailed.

American producers, too, were adversely affected, and they made a plea for higher tariff protection to improve their position. Consequently, the full rate on sugar was increased from 1.256 cents to 2.000 cents in 1921 and to 2.206 cents in 1922. This change meant that the Cuban rate was raised from 1.0048 cents to 1.6000 cents in 1921 and to 1.7648 cents in 1922. Improved business conditions and adjusted supply and demand factors carried prices upward again.

EXHIBIT 13
CUBAN RAW SUGAR STOCKS AT BEGINNING OF YEARS, 1917-1938

Year	Thousands of short tons	Year	Thousands of short tons
1917	252	1928	174
1918	201	1929	398
1919	319	1930	327
1920	279	1931	1,565
1921	1,109	1932	1,897
1922	100	1933	1,788
1923	45	1934	1,224
1924	106	1935	716
1925	467	1936	553
1926	446	1937	249
1927	747	1938	478

Source: U. S. Cane Sugar Refiners Association, *Sugar Economics, Statistics and Documents* (New York, 1938), Table 57, p. 71.

The improvement in prices in the early twenties caused Cuban producers to adopt a policy of further expansion of their war-inflated production. Java also increased its annual production by a million tons between 1920 and 1925. By 1925-1926, however, European beet-sugar production had recovered from a wartime low of 2,500,000 long tons in 1919-1920 to nearly 7,500,000 long tons. About three-quarters of a million tons were added to the annual sugar production of the United States and its possessions over this same period. Consequently, Cuba and Java were producing for a world market the needs of which were being supplied

in increasing amounts by other producing areas. A serious world surplus was evident in 1925, and prices declined from 7.0 cents per pound in 1923 to 4.3 cents in 1925.

Some measure of the difficulties encountered by Cuba is reflected in the variation in stocks of Cuban sugar during the last 20 years, shown in Exhibit 13.

Subsequent to the 1920-1921 drop in sugar prices, Cuba had refused a suggestion to restrict production, but had agreed to restrict shipments to the United States in 1922.¹ Drought in the 1922-1923 Cuban sugar season increased world consumption, and the delay in bringing European beet production back to normal after the war aided in the recovery, which reached a peak in 1923, and which was followed by expansion both of Cuban and of world production.

Indicative of the nationalistic attitude toward sugar during this period was the practice of Great Britain, which had been for many years the exponent of free trade. In 1919 imperial preference gave British Empire sugar a reduction of one-sixth of the duty when entering the important English market. In 1924 the highest subsidies on record were granted to English beet-sugar producers, and the home industry developed rapidly, thus curtailing further the imports of a nation formerly supplied by the international sugar market. In addition, bounties up to 11 cents a 100 pounds were paid on exports of refined sugar.²

In fact, to many countries, subsidizing the production of beet sugar appeared to be a solution to various problems. In the first place, the industry required much labor in cultivating and harvesting the crop, which meant that many men could be put to work. Furthermore, the war had just a few years previously shown the advantages of a domestic sugar supply, so that economic self-sufficiency seemed desirable.

The developments in the sugar markets during the middle 1920's reacted adversely upon Cuba. This republic was the principal country producing for world consumption, inasmuch as Java had been able to find a relatively free market in the Far East for which its transportation cost advantage over Cuba was considerable.

¹ Martin, R. F., *International Raw Commodity Price Control*, National Industrial Conference Board Study No. 238 (New York, National Industrial Conference Board, 1937), p. 58.

² *Federal Register*, Vol. 3, No. 38, Feb. 24, 1938.

The political urgency of protecting the Cuban industry was apparent. Consequently, the Cuban government adopted a policy of restricting production, although curtailing supplies obviously would affect the larger mills since they needed a large volume of operations to keep overhead costs at a minimum.

In May, 1926, urgent appeals to the Cuban government by the Planters' Association resulted in an act which restricted output of each mill to 90% of the estimate of the current crop to be ground at that mill, and which limited the 1927 crop to 4,500,000 tons.¹ Excess production was controlled by taxation. The president of Cuba was also granted the power to impose restrictions up to 10% on crops during 1927 and 1928, if he deemed such restriction necessary. He was further empowered to fix the dates when grinding of each crop might begin.

In October, 1927, the Sugar Defense Act in Cuba created a National Sugar Defense Commission. This action was taken as a result of increasing stocks and declining prices which led to demands for more rigid governmental control of Cuban sugar. The Cuban president was authorized to fix the total size of the sugar crop of Cuba, to determine its allocation among the mills, and to tax excess production at the rate of \$20 a bag. Exports to the United States were to be in accordance with assigned quotas. Sales to countries other than the United States were to be handled by the Export Corporation established for this purpose.² Most of the stock of the Export Corporation was to be subscribed by the mill operators in proportion to their output.

Meanwhile, the Vereenigde Javasuiker Producenten³ in the Netherlands East Indies had begun to hold sugar supplies hoping for an improvement in prices. It constructed storage facilities in order to carry over sugar from the 1927 crop not disposed of during the normal selling season.

Cuba soon realized that world action was necessary to make restriction a real benefit to Cuban growers rather than an aid to foreign producers of sugar to increase their output at the expense of Cuba. Consequently, the president of Cuba called an international conference to meet in October, 1928. The purpose

¹ Foreign Policy Association, Commission on Cuban Affairs, *op. cit.*, p. 241.

² Martin, *op. cit.*, p. 59.

³ A cooperative selling agency which usually sold at least 90% of the sugar produced in Java.

of the conference was world-wide restriction of sugar production and export. The main countries refusing to participate were Java, the United States, and Russia, all of which were important producers.

Cuban crops continued to be restricted by the government, and in July, 1929, the Cuban president issued a decree stating that all Cuban exports of sugar, without exception, were to be sold through the Cooperative Export Agency. This agency rejected offers considered to be too low and attempted to hold out for fair prices. No provision was made for financing the growing and harvesting of crops, however, and while the Export Agency was holding sugar for better prices, the colonos and small mill owners were squeezed for funds. Protests led to abolition of the Export Agency in April, 1930. At that time some 3,000,000 tons of raw sugar which the Export Agency was holding were offered on the market, driving sugar prices further downward.

The Vereenigde Javasuiker Producenten in Java also was having difficulties at this time. The excess Cuban production was competing with Java sugar in Europe, and increased production in Formosa took away part of the Far Eastern market formerly supplied by Java.

American cane-sugar refiners on the Atlantic and Gulf coasts, finding themselves faced with what they described as unfair trade practices and cutthroat competition, formed in 1927 the Sugar Institute, Inc., to improve conditions in the industry.¹ This association made no attempt to restrict production but directed its principal efforts toward the publication of prices, the prevention of rebates and concessions, and the increasing of domestic consumption of sugar.

The world depression after 1929 increased the difficulties of Cuba and other contributors to the world sugar market. Not only did the market shrink but the depression also stopped the financing of the tropical producing areas by London and New York capital, thus increasing the financial difficulties of these areas. At the same time production in importing countries supplied an increasing proportion of the demand of these countries.

Between 1930 and 1932 the decline in world consumption brought about a widespread use of restriction and protection of the sugar industry by various countries. The United States

¹ See p. 323.

raised its sugar tariff, and control over sugar production, refining, and marketing, through one means or another, was established in Sweden, Lithuania, Argentina, Brazil, Guatemala, Latvia, Denmark, Spain, and France.¹ These controls ranged from quotas for individual refineries to government monopolies.

Such restrictions in conjunction with the British domestic bounty and Empire preference reduced the size of the world market for countries producing sugar surpluses in excess of domestic needs. A five-year retirement plan to withdraw surplus sugars from the market was embarked upon by Cuba in October, 1930, under the sponsorship of Thomas L. Chadbourne of New York. The carry-over was to be segregated and disposed of over a five-year period in an orderly manner. Government bonds were issued to pay owners of the surplus sugars for the portion of the crop retired from the market.

In November, 1930, a committee headed by Mr. Chadbourne and representatives of Cuban sugar interests went to Amsterdam to confer with representatives of European beet-sugar producers and refiners and with those from the Javanese sugar industry. In May, 1931, a conference was held in Brussels, and an international agreement was signed by Cuba, Java, Germany, Poland, Czechoslovakia, Hungary, and Belgium. These countries produced about 40% of the world's sugar and approximately 90% of the exports to the world market. Peru and Yugoslavia joined later. The plan involved a five-year marketing agreement, under which export quotas for each country were set, and provision was made for an increase in quotas in case sugar prices rose above 2 cents a pound, f.o.b. Cuba, for thirty consecutive days. An International Sugar Council was set up to administer the plan, commonly known as the Chadbourne Plan. The sugar stocks which accumulated under the Chadbourne Plan were to be disposed of over a five-year period.

Although the Chadbourne Plan succeeded somewhat in reducing sugar stocks, it had little effect in the way of raising prices. As was the case with most other international agreements restricting output, producing countries not signing the agreement increased production. The two principal importing countries, the United Kingdom and the United States, also did not sign the agreement, and the beet-sugar industries of these two countries,

¹ Martin, *op. cit.*, p. 62.

which could then sell in a protected domestic market, increased their production of sugar.

The statistics in Exhibit 14 show increased production in those countries not participating in the Chadbourne Plan, and substantial decreases in those countries where production was restricted. Because of the decreasing demand and the increasing supply from noncooperating countries, the Chadbourne countries consistently underestimated the amount of curtailment necessary. On the other hand, a decrease of 49% in a world commodity is a substantial reduction, and additional restrictions beyond this drastic cut would have been extremely difficult.

EXHIBIT 14
WORLD PRODUCTION OF SUGAR UNDER THE INTERNATIONAL AGREEMENT
(CHADBOURNE PLAN)
(In millions of quintals)

Item	1929-1930	1934-1935	% Change
Controlled area.....	121	62	-48.8
Uncontrolled area.....	136	162	19.1
World total.....	257	224	-12.8
Cane sugar.....	172	136	-20.9
Beet sugar.....	85	88	3.5

Source: League of Nations Economic Intelligence Service, *World Economic Survey, 1934-1935* (Geneva, League of Nations, 1935), p. 97.

Cuba's vast contraction of production in this period had serious consequences. Its market in the United States was being taken by the insular possessions of the United States, and Cuba was experiencing political difficulties as well as a severe economic crisis. "The situation had brought actual starvation as well as political and social conditions which verged upon anarchy. After the expulsion of President Machado in August, 1933, there occurred a year of political disorder unparalleled even for a country accustomed to political upheavals."¹

Sugar was not included in the Agricultural Adjustment Act of 1933 in the United States. Since only a quarter of our sugar requirements are produced in the continental United States, the offshore producers would have benefited by the limitation of production plan used on other domestic farm products. To raise

¹ Dalton, *op. cit.*, p. 251.

the tariff would have caused domestic consumers to pay more for their sugar and would have encouraged increased production in the United States continental and insular areas at the expense of Cuba, or would have forced Cuban prices correspondingly lower. Beet-sugar interests, furthermore, were not eager to have their commodity included in a plan which advocated the restriction of production.

The sugar industry sought to work out a stabilization plan with the Secretary of Agriculture under the licensing powers granted to the Secretary, but the plan as finally evolved, which made no provision for tariff reductions, was not accepted by the Secretary of Agriculture. According to the Secretary, consumers would have been charged more under this plan without any resulting benefits to the farmer.¹

An International Sugar Conference² met in London in March, 1934, after it was evident that some sugar legislation would be passed by the United States Congress. The refusal of the United States Government to commit itself at that time, however, resulted in early adjournment of the conference.

The Jones-Costigan Act,³ which provided for the inclusion of sugar beets and sugar cane as basic commodities under the Agricultural Adjustment Act, was approved in May, 1934. Under this act powers were granted to the Secretary of Agriculture to grant licenses and establish quotas in carrying out the provisions of the act. The most difficult problems arose, of course, in the assigning of marketing quotas to the various producing areas. The domestic beet-sugar growers, in particular, held that they had an inalienable right in the American market, and that their production should not be curtailed. In the hearings on the bill it was quite evident that inducements were being held out to the sugar-beet interests to secure their support of the legislation.⁴

¹ *The New York Times*, Oct. 10, 1933, p. 37.

² This conference resulted from a recommendation of the subcommittee on sugar of the World Monetary and Economic Conference held in London in June and July, 1933. The International Sugar Council, administering the Chadbourne Plan, cooperated with this subcommittee and presented it with a report reciting the experiences of the council in negotiating with the principal sugar importing and exporting nations.

³ 48 Stat. 670, C. 263.

⁴ Secretary Wallace emphasized in his testimony the great concessions made to sugar-beet producers in comparison with other farmers. The Secretary said: "It is a proposition so good that it would seem to me that any Mountain States Senator or Congressman, going home, would have something really to talk about." U. S. Senate Committee on Finance, Seventy-third Congress, Second Session Hearings, *A Bill*

Florida, with a small but expanding cane-sugar industry, also wanted a chance to increase its production.

The Jones-Costigan Act established a specific quota for the continental beet-sugar producing areas and for Louisiana and Florida. Quotas for the Philippines, Cuba, Puerto Rico, and Hawaii were to be based on the average quantities shipped into the United States for consumption during any three-year period between 1925 and 1933 which the Secretary might choose as most representative. Imports of refined cane sugar were also to be restricted by quotas. For Cuba not more than 22% of the import quotas established for all sugar could be made up of refined sugar. The refined sugar quotas for the Philippines, Hawaii, and Puerto Rico could not exceed the largest annual shipments occurring in any one of the years 1931, 1932, and 1933.

The consumption requirements of sugar for the continental United States for the calendar year 1934 and for each succeeding year were to be determined by the Secretary of Agriculture. These estimates were to be adjusted by the Secretary to meet changing conditions in the market. In case consumption appeared to be running in excess of quotas, the Secretary was permitted to revise the quotas upward; in case consumption appeared to be running behind quota estimates, the Secretary had the power to decrease the quotas. If any producing area was unable to fulfill its quota, the Secretary could reapportion the deficiency among other producers, thereby increasing their quotas. The Secretary of Agriculture was further empowered to deduct from any area's production quota an amount equivalent to the unsold surplus stocks of sugar produced in that area.

A processing tax of 0.50 cents a pound raw value also was established. The processing taxes on Puerto Rican, Hawaiian, and Philippine sugars were segregated into special funds to be used either for the benefit of agriculture in those areas or to be paid producers for restricting production.

Quotas¹ were established for the principal producing areas by the Department of Agriculture; the revised quotas for 1934 and

to Include Sugar Beets and Sugarcane as Basic Agricultural Commodities under the Agricultural Adjustment Act and for Other Purposes (Washington, Government Printing Office, 1934), p. 10.

¹ The quotas for the offshore areas were fixed by taking the average continental United States consumption of sugar from the Philippines, Puerto Rico, and Cuba for 1931, 1932, and 1933, and of Hawaiian sugar for 1930, 1931, and 1932, and adjusting

1935 are shown in Exhibit 15. From the quota assigned to a particular area, allotments¹ were assigned to the individual processors or producers within that area. These allotments were made in the continental beet area but not in the continental cane area, where production adjustment contracts were signed direct with the producers. Allotments were made in Puerto Rico and Hawaii, and by the Philippine government to the producers in the Philippine Islands.

EXHIBIT 15
REVISED QUOTAS FOR PRODUCING AREAS, 1934 AND 1935
(In short tons, 96 degree raw value)

Area	1934	1935
Cuba.....	1,866,482	1,822,596
Philippines...	1,005,602	981,958
Puerto Rico....	807,312	788,331
Hawaii.....	948,264	925,969
Virgin Islands.....	5,304	5,179
Full-duty countries.....	25,836	25,228
U. S. sugar beets.	1,556,166	1,550,000
U. S. sugar cane.....	261,034	260,000
Total.....	6,476,000	6,359,261

Source: U. S. Department of Agriculture, AAA, *Agricultural Adjustment, 1933 to 1935* (Washington, Government Printing Office, 1936), p. 216.

Tariffs on raw sugar were reduced twice in 1934 in connection with the United States sugar program. On June 8, under the flexible tariff provisions already enacted, the President reduced the Cuban sugar tariff by 0.50 cents a pound, setting it at 1.50 cents a pound. In August, 1934, a reciprocal trade agreement with Cuba lowered the duty on Cuban sugar from 1.50 cents a pound to 0.90 cents a pound.

Benefit payments to continental beet and cane producers cooperating in the program for sugar were provided by the Jones-Costigan Act, and the difference between the fair exchange value of the crop and the market price was to be paid to producers out of

the averages to the total of 4,642,000 tons. (*Commercial and Financial Chronicle*, June 2, 1934, p. 3690.) The base periods were different in order to compensate for the recent rapid growth of Philippine and Puerto Rican sugar production as compared with the relatively stable production in Hawaii.

¹ In determining allotments to the 27 beet-sugar companies, account was taken of the five-year average production of the various processors, with particular attention to the last two years. A small reserve of $1\frac{1}{2}\%$ of the total allotment was set up to make adjustments. From the allotment made to a beet-sugar processor, individual acreage allotments were then made to the beet growers.

funds collected from the processing tax on refined sugar. Cuba, of course, did not share in the payments, although a tariff reduction was made on Cuban sugar, and Cuban producers received higher prices. In the drought year, 1934, the beet farmers were paid the difference between the market price of their crop and the fair exchange value of normal production from the acreage planted. Thus, a little over 50% of the commercial value of the 1934 beet crop was paid in benefits.¹ The 1935 bounty was considerably less, as sugar prices had risen by then, and it was paid on actual, rather than normal, production.

Benefit contracts signed by individual beet growers and the Secretary of Agriculture abolished labor for children under 14. The Secretary was also empowered by the benefit contract to set minimum wages for adult beet field labor, but such action was taken only in areas in which a dispute on the question had arisen.

EXHIBIT 16
BENEFIT PAYMENTS TO PRODUCERS UNDER THE SUGAR ACT
(May, 1934, to October, 1936)

Area	Payments	% of Total
Louisiana	\$ 9,463,418	11.73
Florida	1,231,727	1.53
Beet area	29,158,469	36.16
Hawaii	13,323,861	16.52
Puerto Rico	12,099,904	15.01
Philippines	15,359,533	19.05
Total	\$80,636,912	100.00

Source: *New York Journal of Commerce*, Nov. 30, 1936, p. 21.

Three types of payment were developed for allotting benefits to the United States insular areas under the Jones-Costigan Act: 90% of the processing tax on sugar from Hawaii was returned to the Hawaiian sugar-cane producing companies for restricting production on their own lands and permitting the few independent planters affiliated with these companies to continue planting at the same rate; Puerto Rican producers received payment on the basis of the market value of the unused cane; and Philippine producers received payment based on the cost of the unused cane.²

¹ Dalton, *op. cit.*, p. 155.

² U. S. Department of Agriculture, *Agricultural Adjustment, 1933 to 1935*, pp. 221-224.

Hawaii had been very much disturbed about the quotas and instituted a lawsuit to have them removed, but was unsuccessful.¹

From Exhibit 16 it appears that of the \$80,000,000 benefit payments made under the Jones-Costigan Act almost 50% were to producers in continental United States.

In January, 1936, the United Supreme Court declared certain parts of the Agricultural Adjustment Act unconstitutional.² The benefit payments, processing tax, and the child labor and minimum wage parts of the sugar legislation were thereby voided, but the quota system remained undisturbed. In the spring of 1936 Congress extended the sugar quota provisions to January, 1938.

In place of the Agricultural Adjustment Act, the Soil Conservation Program was substituted.³ This provided for improved agricultural practices in the interests of conserving soil and also for restoring the purchasing power of farmers to prewar levels. Benefit payments to sugar growers under this plan were substantially lower than were those under the Agricultural Adjustment Act. Whereas beet growers in 1935 received benefit payments of about \$1.03 a ton under the Agricultural Adjustment Act, they received in 1936 about \$0.36 a ton under the Soil Conservation plan.⁴

Despite the Supreme Court's decision, the Sugar Act of 1937⁵ reestablished the processing tax. The benefit payments were also reestablished and quotas reapportioned, as shown in Exhibit 17. These quotas, established by Secretary of Agriculture Wallace on September 2, 1937, were retroactive to January 1, 1937. Under the new act the marketing quota provisions of the original Jones-Costigan Act were extended through 1940.

Benefit payments were provided for growers under the new act on condition that they comply with the child labor restrictions, pay the minimum wage rates to be set by the Secretary, produce only the quota allotted, and comply with the farming practices recommended for the preservation of the soil and the prevention of erosion. These payments on each pound of sugar were to be less

¹ *Ewa Plantation Co., et al. v. Wallace*, 62 Wash. Law Rep. 830 (1934).

² *United States v. Butler*, 297 U. S. 1, 56 S. Ct. 312.

³ This program was adopted under authority of the Soil Conservation and Domestic Allotment Act passed in February, 1936 (Public No. 461, Seventy-fourth Congress).

⁴ Dalton, *op. cit.*, p. 159.

⁵ 50 Stat. 903, 7 U.S.C. Sec. 1100, *et seq.*

for the large farms than for the small ones. The base rate of payments was 60 cents a hundred pounds, but on farms producing more than 500 tons the rate was reduced by graduated steps as the volume of production increased. An excise tax of 50 cents a 100 pounds of sugar (raw value) was levied by the act upon all manufacturers of sugar in the United States, and a compensating tax was to be levied on imports of manufactured sugar. This tax was the same in amount as that established by the Jones-Costigan Act.

EXHIBIT 17
QUOTAS UNDER THE SUGAR ACT OF 1937
(Short tons, raw value)

Area	1937 quotas under the Sugar Act of 1937	1937 quotas under Jones- Costigan Act
Continental United States beets.....	1,633,361	1,613,576
Continental United States cane.....	442,793	270,664
Hawaii.....	988,551	976,685
Puerto Rico.....	840,954	831,508
Virgin Islands.....	9,396	5,462
Philippine Islands.....	1,085,304	1,035,742
Cuba.....	2,014,538	1,922,423
Other foreign countries.....	27,610	26,610
Total.....	7,042,507	6,682,670

Source: U. S. Department of Agriculture, Agricultural Adjustment Administration, *General Sugar Quota Regulations*, Series 4, No. 2, Sept. 2, 1937.

On September 29, 1937, the Agricultural Adjustment Administration announced the method for determining proportionate production allotments for farms in the continental United States cane-sugar area for the 1938 crop. The average acreage in cane in 1935, 1936, and 1937 was to be used to determine this proportionate share, provided it did not exceed 60% of the crop land suitable for the production of sugar cane on the farm.¹ The estimated total of the 1938 mainland cane crop upon which payments would be made was set at 439,071 short tons, although the total crop was expected to exceed 550,000 tons. On February 4, 1938, President Roosevelt signed the appropriation bill authorizing an expenditure of \$39,750,000 for payments under the Sugar Act of 1937.²

¹ U. S. Department of Agriculture, AAA, S. D. No. 8, Sept. 29, 1937.

² *Ibid.*, Feb. 19, 1938, p. 1171.

Before the 1937 sugar act was passed, the United States signed the International Sugar Agreement resulting from a conference at London in April, 1937, in which representatives from 22 nations met.¹ England also signed the agreement, and for the first time the two principal importing countries were a party to international sugar control. Japan was the only important producing country not signing the agreement, but an official observer from that country assured the conference that this country would cooperate in so far as possible.

EXHIBIT 18
1937 INTERNATIONAL SUGAR AGREEMENT QUOTAS FOR SUGAR EXPORTS

Country	Basic quota, in metric tons
Belgium (including Belgian Congo).....	20,000
Brazil.....	60,000
Cuba.....	940,000
Czechoslovakia.....	250,000*
Dominican Republic.....	400,000
Germany.....	120,000
Haiti.....	32,500
Hungary.....	40,000
Netherlands (including overseas territories).....	1,050,000
Portugal.....	30,000
Peru.....	330,000
Poland.....	120,000
U.S.S.R. (excluding exports to Mongolia, Tannu Tuva, and Sin-Kiang).....	230,000
Total.....	3,622,500

* Czechoslovakia will have the following extra allotments: year beginning Sept. 1, 1937, 90,000 metric tons; Sept. 1, 1938, 60,000 metric tons; and Sept. 1, 1939, 25,000 metric tons.
Source: League of Nations Publications, Series II, Economic and Financial (1937), II, B. 8, *International Sugar Conference, London, 1937*, Chapter IV, Article 19.

This agreement provided a maximum of 3,622,500 metric tons of sugar to be exported “for the free market.”² A five-year program was established, to become operative immediately, and to be reflected in the 1938 crop. Three main activities were agreed upon: (1) the regulation of production of exportable supplies; (2) aggressive advertising to stimulate consumption; and (3) the establishment of a central clearing house of information. The

¹ This meeting was a continuation of the efforts to secure international agreement through the International Sugar Conference which had had no success in 1934.
² League of Nations Publications, Series II, Economic and Financial (1937), II, B. 8, *International Sugar Conference, London, 1937*, Chapter IV, Article 19.

mechanics of the plan followed those of the Chadbourne Plan of 1931.

National quotas for sugar exports to a free world market were set as shown in Exhibit 18. A quota of 47,500 tons was placed in reserve with the understanding that it be divided between France and Yugoslavia.

The United States agreed not to reduce the proportionate share of the full-duty countries; to assign to full-duty sugars the equivalent of any reduction in the Philippine quota below the quantity at that time admitted free; and not to increase full-duty sugar tariffs during the life of the agreement.¹

According to one writer, restriction schemes and price-fixing experiments may be divided into two groups: those that have failed, and those that will fail.² Another writer has stated that restriction is economically sound only as a means of meeting a temporary decline in demand, and then only if there is no excess capacity in the industry and the productive capacity is not obsolete from an operating point of view.³ An additional point essential to a restriction scheme is that all producers must be included in the agreement. Restriction of sugar production is complicated by the system of bounties, protected markets, tariffs, and the desire for economic self-sufficiency. The failure of somewhat similar plans to improve prices of coffee, rubber, silk, cotton, nitrates, wheat, and tin, as well as sugar itself, apparently did not deter the signatory nations from trying another plan to restrict production and raise the prices of sugar.

The only significant difference between the new plan and the Chadbourne Plan is the inclusion of the United States and Great Britain in the new scheme. This addition meets one qualification for a successful restriction scheme, but other disadvantages inherent in the sugar industry are not disposed of by the new plan. One of the principal difficulties in sugar has been that importing nations have encouraged increased production of sugar within their own tariff walls, regardless of cost. Cane and beet growers in the United States, Hawaii, and Puerto Rico, and beet growers in Great Britain are high-cost producers whose output has expanded at a rapid pace in recent years. A portion of the market formerly

¹ League of Nations Publications, *op. cit.*, Chapter III, Article 9.

² Backman, Jules, *Adventures in Price Fixing*, Farrar & Rinehart, Pamphlet Series No. 8 (New York, Farrar & Rinehart, 1936), p. 55.

³ Rowe, *op. cit.*, p. 217.

supplied by exporters has been taken over by domestic producers. This is a permanent shift, not a temporary decline in demand, and has resulted in excess productive capacity in the exporting countries. The problem of excess capacity is accentuated by the variations in costs of production between countries, and within the same country. Java is a low-cost producer, as are the areas in the eastern part of Cuba. In the western part of Cuba are the older, higher-cost producers who must be included in the Cuban quota. It appears, therefore, that this plan for restricting production of sugar requires the lower-cost producers to carry the financial burden of higher-cost producers. The latter would probably reduce capacity or even cease operations without the support of a restriction program.

The outbreak of war in Europe in September, 1939, changed the international sugar picture substantially, and the schemes for control of production and imports will undoubtedly be changed to meet the needs of war. The United States sugar-control program was discarded temporarily when President Roosevelt announced on Sept. 11, 1939, that the quotas on the importation and domestic marketing of sugar would be lifted. On the following day, it was announced by the Secretary of Agriculture that the tariff on Cuban sugar would be raised from 0.90 cents a pound to 1.50 cents a pound, since this increase was required by law in case the Cuban quota was raised to a figure above that set by the provisions of the Sugar Act of 1937. Thus, Cuba could ship as much sugar into the United States as could be absorbed over the higher tariff wall. Other producing areas were also relieved of their production restrictions, although they would no longer be eligible for benefit payments as long as the quotas were declared to be ineffective.

To forecast the situation when the war ends is obviously impossible at this early stage, but undoubtedly the same problems that faced the sugar trade before September, 1939, will again appear. On the basis of the past, it is also likely that some scheme will be introduced to control production and restrict imports. Such restrictions may be a graceful method of slow retreat, but they cannot be considered as an aggressive attack on the problems of sugar.

The problem of international control is directly related to, and in a number of ways dependent upon, the control schemes set

up by the individual nations. In the establishment of quotas the United States distributed its market among those producing areas which were a part of, or closely related to, this country. Such a course involved a restriction of production in some of the areas, but in all except Cuba the proportion of the area's production consumed in the United States approached 100%. The actual tonnage as well as the percentage of Cuban production exported to the United States also increased after the establishment of the quota system.

Before the quota system was temporarily abandoned, the areas producing for the American market were drawn together into a compact unit within the world market. Such a system was obviously advantageous to the producers of sugar beets and sugar cane within those areas, particularly where benefit payments were also made. Cuba and the Philippines could probably compete in world markets without quota systems, but it is certain that the other areas producing for the American market could not. As a system of protection, the quotas were more effective than the tariff, because full-duty sugars were virtually excluded by the quota.

In normal times it seems clear that the quota or some similar scheme must be continued to prevent economic and political chaos in Hawaii, Puerto Rico, and probably the Philippine Islands and Cuba. With no quota system and if shipping were not disrupted by a major war, foreign sugars could be poured into the American market even with a substantial duty. Before the European war which began in 1939, the so-called free world market had been contracted by the import restrictions of various countries, and to an increasing extent producing areas had been segregated for the purpose of supplying a particular market.

The question arises, however, as to the degree of control exerted by government administrators under the quota system, and as to whether or not this control was used wisely. One aspect of this question is the degree to which the quota system and the changes in the quota affect the price of sugar. From trade reports it was apparent that the announcement of quotas, or of reallocation of quotas, had a definite effect on the market. Some argued that the effect was purely psychological, but it was apparent that the decisions and announcements of the Department of Agriculture caused definite fluctuations in the market.

For this reason, one trade journal advocated the establishment of "fair fixed prices."¹

The Secretary of Agriculture obviously had no direct control over demand, but he did have a very direct control over the supply available for the United States market and the total production of sugar in the areas under his jurisdiction. Since total demand was relatively steady, the Secretary had direct authority over the most important factor determining price.

From a theoretical point of view, the United States price is the world price plus the full duty for sugar landed at New York, adjusted, in the case of Cuba, for the Cuban preferential. The definite limitations on the amount of sugar which Cuba and the full-duty countries could sell in the world market made this differential ineffective, and in 1938 the United States price was below the world price plus the full duty. The quantity of sugar made available in the United States market appears to be the primary factor which determines price, and the relationship between the United States price and the world price, therefore, is not exact.

Dr. Hugo Ahlfeld has made the point, in speaking of export quotas, that the quantity of production and of stocks is as important as quotas in the determination of the world price.² This point may be accepted as important in the determination of world prices and the actual level at which these prices will prevail. If this statement is true, then it is certain that the American quota alone did not set the level of prices in the American market.

The relation of the government's control program to price was direct. The effect of these prices on the consumption of sugar is a matter of great importance both to the industry and to the government. Professor Schultz's research has indicated that the demand for sugar is relatively inelastic.³ Consequently, an increase in price will not result in a proportionate decrease in consumption. On the other hand, it appears that per capita consumption has been decreasing since the early 1920's, although this has not been a clearly defined change because of the influence of such factors as business conditions and rapidly changing price levels.⁴ If these findings are correct, when a quota system is again established it

¹ *Facts about Sugar*, Vol. 33, No. 11, November, 1938, p. 23.

² *The International Sugar Journal*, Vol. 40, No. 469, January, 1938, p. 5.

³ Schultz, Henry, *The Theory and Measurement of Demand* (Chicago, University of Chicago Press, 1938), p. 230.

⁴ *Ibid.*, p. 232.

will be jeopardized by the accumulation of stocks, unless per capita demand increases. The increase in population will provide some additional outlet by increasing total consumption, but the rate of growth of population has been leveling off rapidly. In other words, a quota system is an attempt to retain the *status quo*, and there seems to be some doubt that over a period of years a control scheme based on control of production and increased prices can be adjusted to a declining rate of demand without serious consequences.

APPRAISAL OF THE PROBLEMS OF THE SUGAR INDUSTRIES

While the entire industry will be affected by the European war, this dislocation must be considered more or less temporary and the problems which result from permanent maladjustments must be considered of principal importance since these problems will still be present after the war. Undoubtedly the war will intensify some of these problems in later years. The lifting of the quotas and the elimination of the benefit payment have changed temporarily some of the problems discussed below but the discussion will apply again in the future when quotas are reestablished. Should this country enter the war it is probable that the restriction on the industry will be even more severe.

In an appraisal of the business problems of the United States sugar industry, the interests of the various groups must be kept separate. The producing areas are distinct from each other geographically, politically, economically, and in some cases racially. The agricultural producers in each of these areas have different problems, and the first processors are, in most cases, in a separate category from the farm producers. The sugar-beet processors are also refiners; yet their situation is not comparable to that of either the continental or offshore refiners of raw cane sugar.

The central problem of all groups is the degree and application of control by the Federal Government. Under the quota system, the effect of this control varied among the different groups, but all were concerned in almost every aspect of their business with government regulation and control.

The agricultural producers were directly affected in all phases of their operations. The government administrators determined

the volume of beets or cane to be produced, and the costs of labor (by setting wage rates); the gross farm and plantation income was determined both by the effects of the quota on price and by the benefit payments made to the producer for cooperating in the program. The agricultural producer conformed to the system, because there was essentially Federal compulsory limitation of farm output and the financial benefits through "cooperation" were sizable; for example, approximately one-third of the per acre income on a beet farm took the form of a direct cash subsidy.

The continental producers of both cane and beet believed that they should be permitted to produce as much as they could, since all agricultural adjustment programs are supposedly designed to protect and assist the domestic producers. Hawaii considered itself to be as much a part of the United States as any of the states, and asked for unrestricted production, using the same argument as the continental producers. Under these circumstances, when prices decline, complaints and attacks on the system increase.

The first processors of beets and cane in the producing areas were similarly restricted under the quota system. The volume of operations was determined by the government grinding and marketing allotments. Those processors who were also engaged in the agricultural production of sugar cane and sugar beets were obviously in the same category as the agricultural producers and their prices, volume, costs, and income were also fixed. In Hawaii, Puerto Rico, Florida, and to a lesser degree in Cuba and Louisiana, these raw sugar mills were frequently large agricultural producers and were affected similarly. The processors who had no agricultural production were still limited in their grinding operations by the production restrictions imposed on the cane or beet growers and by marketing allotments.

The attitude of the continental refiners of raw sugar toward the price level of sugar is similar to the attitude of the cotton shipper toward the level of cotton prices. The refiner is interested in the price level only in so far as it may affect total consumption and, therefore, the volume of operations, unless, of course, the refiner owns and operates sugar mills and plantations. The spread between the price of raw sugar and the price of refined sugar is the principal interest of the refiner. The variation in this spread is also of importance to the refiner since he buys his raw materials in large quantities. The Sugar Exchange could not

be used effectively for hedging purposes, since the market would be influenced to too great an extent by the volume of hedging operations that would be required by the refiners. Such a hedge, even if executed, could not protect the refiner in the variations in this differential. The allocation of, and changes in, quotas, which obviously could not be forecast by the refiners, affected raw sugar prices in the manner described above. These fluctuations affected the value of the refiner's inventory, since refined prices followed raw prices. Because the spread is so narrow between raw and refined sugar, the refiners buy their sugar closely and attempt to improve profit margins by judicious buying. The quota system and the resulting price fluctuations added another uncertainty to plague the refiner when he was attempting to determine his buying policy.

The effect of the quota system upon the continental refiners of raw sugar can be analyzed from two sides, volume and income. There was no direct control by the government of the volume of melt of the individual cane-sugar refiners. However, there were upper limits to the total amount of raw sugar which could be melted by the industry as a whole, because the quota system determined the total amount of raw sugar which the refiners could purchase. As a result, there was great competition between the individual refineries to secure their share of the industry's total volume of operations, and after the passage of the Sugar Act of 1934 the refiners' margin narrowed considerably. Under the extremely competitive conditions which existed in 1938, they were forced to restore the privilege of guaranteeing against price declines, which privilege had previously been withdrawn from customers.

As far as income is concerned, the continental refiners of raw sugar had no guarantee of benefit payments such as the producers and processors of raw sugar had. On the contrary, there was the necessity of paying a processing tax of 54 cents a 100 pounds of refined sugar, a part of which went back to the tropical refiners in Hawaii and Puerto Rico, who were also producers of raw sugar. Of course, the payment of the tax, around \$45,000,000 a year, necessitated tying up considerable working capital. The tobacco manufacturers have the same problem to a larger degree in the payment of excise taxes on cigarettes, but the flow of cigarettes through the channels of distribution is much more even than the

flow of sugar, and the cigarette manufacturers can safely keep their inventories of cigarettes at a minimum.

The refiners have not had their operating costs controlled by the government under the sugar quota system. Increased unionization after the passage of the Wagner Act has resulted in increases in wages, however. Some refiners have estimated that costs have increased 20% to 40% in recent years.

It is unlikely that American sugar refiners will establish additional refineries in the offshore producing areas. There is overcapacity in the cane-sugar refining industry in the United States at the present time. Furthermore, large capital expenditures are unlikely, when a change in form, substance, or some specific provision in the sugar-control system might wipe out the investment. In addition, land holdings by corporations are restricted in some of the offshore areas, and a refining company would need several raw sugar factories and adjacent growing areas to assure a supply of sugar for refining. There are also operating and transportation difficulties in the establishment of new refineries. Refined sugar brought from the tropics must frequently be reground because it has formed lumps as a result of excessive humidity. Handling costs are higher for refined sugar than for raw sugar, since impurities in raw sugar will be removed in refining and the raw sugars can be handled less carefully.

The refiners attempted to protect their margin in 1938 by withdrawing privileges formerly extended to buyers, but their attempt was unsuccessful. Any further attempts to maintain or improve their margin by definite agreement or additional control would lay the industry open to charges of collusion. The decision on the Sugar Institute case will make the refiners wary of arousing suspicion in matters of this sort.

The changes in per capita consumption are of importance to the refiners as well as to the producing areas. Hostilities in Europe which began in September, 1939, will undoubtedly be considerably more important than any other factor in the determination of sugar prices in the near future. Postwar readjustments will have to be made before this and other countries settle back to the stability of a quota system. Prior to the outbreak of the war, the operations of quota systems throughout the world made it appear that, except for war, the general level of sugar prices would probably not undergo any material change. There

is no reason to believe that a quota system will restrict consumption, but if demand decreases over a period of years and prices are affected adversely, attempts will probably be made to peg prices rather than to restrict production further.

In the case of sugar, government control has extended further than in any other agricultural product. If the next step in this control program is to fix prices and to distribute total consumption requirements by allotment to the various refiners, the logical step to follow would be the fixing of quotas for consumers. In other words, it appears that complete control must be achieved to accomplish the results for which partial control is designed. Otherwise some group within the marketing and processing mechanism will complain of unfair and unjust discrimination. But to impose such control on demand as has been imposed on supply would raise much larger questions of personal freedom of action within a democracy. The enforcement of such control would necessitate a completely new political philosophy for this country.

In summary, it appears that the attitude of the government and its representatives administering the sugar-control system is the primary problem of the entire sugar industry. Changes in personnel or in the party in power in Washington may change some of the details and may improve the system as experience is accumulated. There seems to be no doubt, however, that some means of control will be continued so that the sort of business decisions which are left entirely to the management of a concern in the sugar industry will continue to be restricted. It is all the more necessary, therefore, that attention of executives in the sugar industry be concentrated on those types of problems where individual discretion still remains, in order that the individual concern may retain or improve its competitive position.

CHAPTER VII

THE TOBACCO INDUSTRY

Consumers are constantly aware of the tobacco industry because of the tremendous momentum which advertising has created in the sale of tobacco products. The government has reaped golden harvests from the tobacco manufacturers, whose products yield more than half a billion dollars in taxes each year. The farmer, however, eyes the manufacturers with some distrust, since his own share in this industry's income seems to him disproportionately low.

The acreage planted to tobacco is relatively small, amounting to only 1,400,000 acres in recent years, as compared with 30,000,000 acres for cotton, 50,000,000 for wheat, and 100,000,000 for corn. The preparation of tobacco for the market by the farmer is distinctive, however, in that the farmer performs the first manufacturing process. This initial curing of tobacco may take as long as three or four months, but in the case of the largest proportion of tobacco, known as flue-cured, takes only three to five days.

The huge volume of advertising sponsored by the major cigarette manufacturers would seem to indicate that a state of intense competition exists among them. It is surprising, therefore, to hear complaints of monopoly and collusion. No doubt this unfavorable impression arose partly from the fact that the companies producing Camels, Lucky Strikes, and Chesterfields were formerly part of the old American Tobacco Company. The latter company was dissolved in 1911 by the United States Supreme Court because of its monopolistic position in the industry.

The complaints may be due partly to a feeling of dissatisfaction among the farmers who noted in 1932 that the total farm value of the crop was less than the combined net earnings of the 10 principal processors. Then again, individual farmers are constantly objecting to the rapid-fire method by which crops are bought by the manufacturers, a method which is responsible, they believe, for a lack of correlation between the price and the varying quality of different lots of tobacco.

While the cost of tobacco accounts for only a little over 2 cents, or about 17% of the retail price of the average pack of cigarettes, the government tax amounts to 6 cents or nearly half. Many a pack-a-day smoker pays more to the government for cigarette taxes than he does for income tax; the tax on other tobacco products is a very much smaller proportion of the retail price than the tax on cigarettes. The government and the tobacco companies are very much more aware than the consumer of this steady stream of taxes.

TYPES OF TOBACCO

The manufactured tobacco products are cigarettes, cigars, smoking tobacco, chewing tobacco, and snuff. Since all these products rely for their brand preference on the consumers' taste, a great deal of stress is laid on the blending of the various tobaccos used. These products are prepared chiefly from different proportions of domestic tobaccos, although varying amounts of imported tobaccos are also used. Domestic growers supply the greater part of the tobacco for all the products manufactured in this country.

The variety of the tobacco is determined by the type of seed planted, but since the grower processes the tobacco before taking it to market, the principal classifications of tobacco are derived from the curing process performed by the farmer. These classifications are as follows: flue-cured; light air-cured, which includes the Burley and Maryland types; dark air-cured; fire-cured; and cigar leaf.¹ These classifications are further divided into types, depending on the geographical source of the tobacco, since the variations in soil and climate cause variations in the type and taste of tobacco produced from the same variety of seed. Additional refinements in the description of tobacco refer to the color, texture, quality, length, and location of the leaf on the stalk of the plant, and to the condition of the tobacco.

Flue-cured tobacco is by far the most important type of American tobacco (see Exhibit 1). This type of tobacco provides the principal ingredient in the manufacture of domestic cigarettes despite the fact that approximately half the crop of flue-cured

¹ See U. S. Department of Agriculture, Circular No. 249, *American Tobacco Types, Uses, and Markets*, by Charles E. Gage (Washington, Government Printing Office, August, 1933).

tobacco is usually exported, chiefly to England. Flue-cured tobacco is also used to some extent in the manufacture of smoking and chewing tobacco.

EXHIBIT I
PRODUCTION OF TOBACCO IN THE UNITED STATES
(In millions of pounds) 1919-1938

Year	Flue-cured	Light air-cured		Dark air-cured	Dark fire-cured	Cigar leaf	All other types	Total, all types
		Burley	Maryland					
1919	476.9	300.3	19.6	134.7	287.3	219.6	5.8	1,444.2
1920	616.0	287.7	27.1	110.2	240.7	223.6	3.9	1,509.2
1921	358.8	175.7	18.6	66.9	170.4	212.9	1.6	1,004.9
1922	415.4	276.4	20.0	117.5	250.1	172.6	2.2	1,254.3
1923	580.7	340.4	21.4	120.3	261.4	192.2	1.2	1,517.6
1924	437.3	295.8	24.5	92.2	213.9	180.1	1.2	1,244.9
1925	575.1	277.8	24.7	92.3	210.8	194.5	0.9	1,376.0
1926	560.1	288.8	26.0	78.4	188.8	146.5	0.7	1,289.3
1927	718.8	176.2	26.2	36.7	113.5	139.0	1.0	1,211.3
1928	739.1	269.1	20.5	43.9	136.5	162.9	1.2	1,373.2
1929	750.0	337.4	24.8	60.3	186.9	170.9	2.4	1,532.6
1930	865.1	349.2	19.6	63.7	168.5	181.0	1.0	1,648.2
1931	669.5	424.8	28.1	66.2	186.8	187.9	1.1	1,564.5
1932	373.7	303.7	28.7	36.5	124.2	150.1	0.5	1,017.3
1933	733.4	377.5	22.2	31.0	128.4	78.4	0.2	1,371.1
1934	556.8	252.2*	26.2	40.4†	132.9‡	73.2	.....	1,081.6§
1935	811.2	220.9	28.7	31.0	117.4	87.9	.....	1,297.2
1936	682.9	218.3	30.8	24.6	99.7	98.0	.....	1,154.1
1937	854.9	402.7	25.2	47.4	117.4	105.8	.....	1,553.4
1938	788.1	387.7	29.3	37.9	99.8	113.4	.....	1,456.0

* Includes 18,000,000 pounds not marketed.

† Includes 2,000,000 pounds not marketed.

‡ Includes 6,500,000 pounds not marketed.

§ Includes 26,500,000 pounds not marketed.

Source: U. S. Department of Agriculture, Statistical Bulletin No. 58, *First Annual Report on Tobacco Statistics* (Washington, Government Printing Office, May, 1937), pp. 7-21; Statistical Bulletin No. 63, *Annual Report on Tobacco Statistics, 1937* (Washington, Government Printing Office, February, 1938), pp. 6-16; and U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 12, December, 1938, p. 274.

This type of tobacco is harvested by "priming"; each leaf is picked separately upon maturity, the leaves nearest the ground being picked first and those higher on the stalk at later dates.¹ The leaves are then strung in tiers in the curing barns—log structures carefully chinked with native clay to prevent the loss of heat.

¹ The successive primings are known as "first primings," "second primings," etc. The exception is the picking of the top leaves or tips which are usually harvested immediately after the first primings.

From the firebox outside, heat is conducted through the barn by flues. The farmer must stoke the firebox and maintain as even a temperature as possible, not more than 20 degrees above the average temperature outside during the first thirty to forty-eight hours. This first curing brings out the bright color of the leaf. The temperature is then raised for an additional day to dry out the leaves. Another day of high temperature is required to dry out the stems, after which the farmer's vigil is over. At the end of the curing process the leaves are separated according to color, length, grain, and texture. They are then tied together in "hands" of from 5 to 20 leaves and stored in the farmer's "pack-house" until near-by auction markets are open or until a sufficient quantity has been cured to justify a trip to the auction warehouse. While in storage the tobacco is packed in large piles to remove any tinge of green left in the leaf.

Flue-cured tobacco is known as "old-belt" tobacco or "new-belt" tobacco, depending upon its source. Old-belt tobacco is produced in the Piedmont sections of Virginia and North Carolina, where the bright leaf was first grown. New-belt tobacco is grown farther east on the coastal plain extending from North Carolina through South Carolina to Georgia. This region turned to the production of tobacco as the industry expanded because of the increased consumption of cigarettes. The leaf grown in this area is brighter and lighter than the old-belt tobacco, the varying characteristics arising from the differences in soil. Sometimes a further distinction is made for the tobacco grown between the Piedmont and the coastal plains, which is called "middle-belt" tobacco.

Light air-cured tobacco is the next most important type, and Burley is by far the most important subdivision in this category. At least half the Burley crop is consumed by the domestic cigarette industry; most of the remainder is used in smoking and chewing tobacco; very little is exported. Burley tobacco is grown principally in Kentucky and Tennessee, although smaller amounts are grown in southern Ohio, in western Virginia, and in Indiana, Missouri, Kansas, North Carolina, and West Virginia. Burley is harvested by cutting the stalk of the tobacco plant rather than by picking the leaves individually. The stalks are suspended in the curing barns in such a way as to permit the air to circulate freely. The curing process requires three to four months.

Maryland tobacco is the other important subdivision of the light air-cured tobaccos and is grown in the southern part of that state. Although relatively unimportant in terms of poundage, a small percentage of Maryland tobacco is used in the manufacture of most cigarettes. This tobacco has a neutral aroma; its most distinctive characteristic is its "burn" or capacity for holding fire. Because of these qualities, Maryland can be blended with other tobaccos to improve burning capacity without changing the flavor.

Since *dark air-cured* tobacco is used principally in the manufacture of chewing tobacco, production has decreased along with the demand for this type of tobacco product. The most important types are One-Sucker and Green River. The Virginian tobacco cured in the sun and called Virginian sun-cured tobacco is also included in this classification. A small amount of dark air-cured tobacco is exported, principally to Belgium and the United Kingdom. This tobacco is also used in the manufacture of "black fat" or "water baler" which is exported to West Africa and the West Indies. This product is a chewing tobacco made by treating the tobacco with mineral oil or grease and subjecting it to heavy pressure.

Fire-cured tobacco is grown in Virginia, Kentucky, and Tennessee, and its principal domestic use is in the manufacture of snuff. Some is also used in chewing and smoking tobacco. In harvesting fire-cured tobacco, the stalk is split and then cut off a few inches above the ground. The stalks are left in the fields until they wilt so as to prevent any breaking or bruising of the leaves when they are handled. The tobacco is then carried to the curing barns and suspended in tiers. A week or so later, after the tobacco has turned yellow, the wood fires on the dirt floor are started. Two or three weeks are required for curing.

Two miscellaneous tobaccos produced in small quantities are *Eastern Ohio* and *Perique*. Eastern Ohio tobacco is either flue-cured or fire-cured, and was formerly known as "export tobacco" since its principal market was abroad. Perique, grown in Louisiana, is cured by twisting the tobacco under pressure for a long period. This tobacco, which is very dark, is used now in small quantities for flavoring pipe tobaccos.

Cigar leaf tobaccos are classified according to their use, as fillers, binders, and wrappers. The filler is used to make the body

of the cigar, around which the binder is rolled to shape the cigar and to permit the use of a thin, smooth wrapper on the outside. All types are air-cured by the growers and there is some substitution between them; for instance, a low grade of binder might be used as filler when weather damage lowers the grade, or the best grade of binder might be good enough to be used as wrapper. Cigar wrapper is grown in this country under the protection of a loosely woven, thin fabric stretched over a structure of laths. This shade conserves the moisture and protects the tobacco from the direct rays of the sun and from wind. In some cases, particularly in the Georgia-Florida district, this type of tobacco is grown on large farms by corporations.

EXHIBIT 2

PRODUCTION OF TOBACCO BY STATES: AVERAGE 1927-1936; ANNUAL, 1937, AND 1938
(In thousands of pounds)

State	1927-1936	1937	1938
North Carolina.....	481,939	595,530	519,230
Kentucky.....	305,175	365,785	339,550
Virginia.....	99,838	109,769	105,459
Tennessee.....	103,214	122,757	111,855
South Carolina.....	76,724	108,080	98,430
Georgia.....	65,192	75,013	91,820
Ohio.....	32,502	28,587	24,617
Pennsylvania.....	39,749	28,990	32,690
Maryland.....	25,560	23,450	29,250
Wisconsin.....	32,905	25,102	36,759
Connecticut.....	25,196	21,920	16,726*
Florida.....	7,534	16,786	19,392
Indiana.....	10,017	11,690	10,350
Massachusetts.....	9,024	8,262	6,702*
Missouri.....	5,003	5,550	7,035
West Virginia.....	3,304	3,552	3,190
New York.....	1,054	1,148	1,620
Minnesota.....	1,107	460	770
Kansas.....	258†	170	525
Total United States...	1,325,243	1,552,601	1,455,970

* Including loss after harvest as a result of hurricane and flood estimated as follows: Massachusetts, 1,798,000 pounds, and Connecticut, 4,716,000 pounds.

† Short-time average.

Source: U. S. Department of Agriculture, *Crops and Markets*, Vol. 15, No. 12, December, 1938, p. 275.

Either the grower, the dealer, or the packer "sweat" the cigar leaf tobacco. In this process the leaves of like size and grade are bulked together in a room where the humidity and temperature

are kept constant. The tobacco ferments, increases the heat of the pile, and is then repacked. After the tobacco is uniformly sweated, it is packed in small bales of approximately 45 pounds each. Natural sweating usually requires eight to ten months, while forced sweating, which involves the application of heat, is completed in two or three months.

Pennsylvania is the most important producer of cigar filler in this country, with Ohio next in rank. Filler is also produced in Indiana, Georgia, and Florida. The Connecticut Valley, including the area in Massachusetts, southern New Hampshire, and Vermont, is the most important region producing domestic cigar binder. Binder is also produced in Wisconsin, New York, and Minnesota. Domestic cigar wrapper is grown in Connecticut, Georgia, and Florida.

The production of all tobaccos by states is shown in Exhibit 2.

CULTIVATION OF TOBACCO

An old saying in the South, "It takes thirteen months in a year to make a crop of tobacco," indicates the amount of time required to produce this commodity. Southern tobacco farmers estimate that from 300 to 400 man-hours are needed to prepare, grow, and harvest an acre of tobacco. The curing process adds to this time and requires constant attention day and night in the flue-cured districts, since the fires must be carefully tended. Because of the large amount of labor required, the usual tobacco acreage for a one-family farm is from 4 to 5 acres.¹ The yield per acre is high, however, averaging in recent years from 700 to 900 pounds for the country as a whole.

The preparation for the tobacco crop begins in early spring when the seeds are sown in beds. These beds have previously been steamed or burned to eliminate insects and weeds. After forty-five to sixty days in the seed beds, the plants are transplanted to the fields. The type of tobacco and its use determine the amount of space between plants. Fire-cured tobacco plants usually total about 4,000 to the acre in order to encourage the growth of a heavy leaf. In the types used for cigarettes, the thinness of the leaf is a desirable factor; consequently these plants are

¹ Woofter, T. J., *The Plight of Cigarette Tobacco* (Chapel Hill, University of North Carolina Press, 1931), p. 15.

placed much closer together and average 6,000 to 7,000 plants to the acre.¹

During the entire growing season the ground must be kept in cultivation and insects must be repelled. After transplanting, the plants usually reach maturity in about sixty days. They are then "topped"; in other words, the flower is cut off to prevent the plant from seeding and to divert the strength of the plant to the leaves. This topping results in new suckers appearing at the base of the leaves, and these suckers must be removed. After topping, the leaves begin to ripen, and are ready to be picked within thirty to thirty-five days.

The harvesting of flue-cured tobacco requires especial care since the leaves are easily bruised and broken, impairing the grade. The leaves closest to the ground, called "bottom primings" or "sand lugs," are picked first. The top leaves or tips are picked next; then the "second primings," just above the lugs, are picked. Later pickings proceed up the stalk as the tobacco matures. The cutters, or center leaves, bring the highest prices on the auction markets, although the "leaf" grades, composed of leaves just above the cutters on the stalk, and the better grade of lugs, are also in demand.

Usually tobacco is not grown on land which produced tobacco the previous year, and sometimes the same land is used for tobacco only once in five years. Considerable fertilizer is required in the southeastern states, but it must be applied with care since the amount of fertilizer determines in part the grade of tobacco. Extensive use of fertilizer produces a higher yield but a coarser tobacco that will bring a lower price per pound in the auction warehouse.

The southern tobacco farmer usually produces his crop on a share basis with the landlord, as does the cotton farmer. Fertilizer, supplies, and food are usually secured on credit at a high rate of interest and the loan paid out of the proceeds of the crop. The entire family is kept busy cultivating, harvesting, and curing the crop in order to obtain as much cash income as possible.

MARKETING OF THE TOBACCO CROP

The prevailing method of sale of tobacco is by open auction. Except for cigar leaf, Maryland tobacco sold on the Baltimore

¹ U. S. Department of Agriculture, Circular No. 249, p. 14.

hogshead market, and the small amount handled by cooperatives, the tobacco goes via the auction floor directly from the farmer to the manufacturer or leaf dealer. The auction has developed along with the increase in production of tobacco for cigarettes. In the latter part of the last century and in the earlier days of tobacco production, the farmers packed their tobacco in 1,000-pound hogsheads and shipped them to a market such as Richmond, Lynchburg, Cincinnati, or Louisville. At that time some states, such as Virginia, required that all tobacco sold in public warehouses be inspected by a sampler appointed by the Governor of the state.¹ Bright leaf was usually sold from the warehouse floor, as it is today, where the various piles could be examined by the buyers.

An auction market is usually found in a town located in a tobacco district where sufficient poundage is raised to justify the existence of two or more warehouses. The term "warehouse" is a misnomer, however, since these places are used solely for marketing purposes. The farmers display their tobacco in flat baskets on the auction floor, and it is auctioned off to the highest bidder. Two of the largest auction markets are in Wilson and Greenville, in the flue-cured tobacco belt in eastern North Carolina. A typical large auction warehouse in one of these markets averages 75,000 square feet of floor space and sells from 7,000,000 to 10,000,000 pounds a year. This floor space permits the display of a half million pounds of tobacco at one time.

Each year the marketing season for flue-cured tobacco begins about the first of August in southern Georgia; the South Carolina markets open a week or so later; the North Carolina markets open the last week in August, and the Virginia markets open the last week in September. The opening dates are set each year by the United States Tobacco Association, an organization composed of warehousemen, dealers, and manufacturers. The flue-cured markets are usually open for at least two months and sometimes until the end of February, but most of the sales are made shortly after the opening. The Burley, fire-cured, and dark air-cured markets open the first week of December. The hogshead market

¹ Arnold, B. W., Jr., *History of the Tobacco Industry in Virginia from 1860 to 1894*, Johns Hopkins University Studies in Historical and Political Science, Fifteenth Series, I-II (Baltimore, Johns Hopkins Press, 1897), p. 44.

at Baltimore, where the tobacco is sold at sealed-bid auction, is open throughout the year.

The tobacco is hauled by truck, automobile, or wagon from the farm, unloaded in the warehouse, and placed in flat baskets 3 feet square and 3 inches deep. Each basket of tobacco, which is called a pile, is weighed and tagged. On the tag the farmer's name, lot number, and the number of pounds in each basket are marked, and space is left for the name of the buyer and the price at which the tobacco will be sold. The farmer then selects an available row in which he desires to have his tobacco sold, and awaits the auctioneer and his attendants.

The auction is conducted at rapid speed, sales being made at a rate up to 360 piles an hour. The auctioneer is required by the Warehousemen's Association to maintain this pace in order to complete the sale of tobacco in a particular warehouse and permit the buyers to move without delay to another warehouse in the same market where tobacco is ready for sale. The auction of any pile is begun by the warehouseman, who is required to make the first bid. This original bid requires keen judgment, since the warehouseman must set the bid high enough to satisfy his customer, the farmer, and yet not too high to discourage the buyers. The closer the bid is set to the point the buyers believe represents the true value, the quicker the sale is completed. Thousands of baskets of each grade are being sold, and the buyer knows what price he is willing to pay for the various grades. His inspection of the tobacco gives him sufficient evidence in his own mind to determine the grade and his own top bid. His top bid will be determined by the price that particular grade is selling for at the time. Since a sale must be skillfully consummated at the rate of six times a minute, or within an average time of ten seconds per pile, it is small wonder that the farmer despairs of having a true value set on his year's production. The farmer cannot, in all probability, grade his tobacco accurately, and the fact that impresses him is that in a case of extreme differences in grades, one pile of tobacco may sell for 3 cents a pound and one next to it for 70 cents a pound.

The auctioneer, the warehouseman, and his clerk walk slowly up one side of a row of baskets, and the buyers, including the representatives of the tobacco companies, the leaf dealers, the export

shippers, and speculators or "pin-hookers,"¹ follow on the other side of the row. Bids are expressed in 100-pound units and bidding progresses in quarter-dollar amounts until a price of \$15 a 100 pounds is reached; when the price reaches \$15 to \$25, the bids are usually increased in half-dollar amounts; and when it is higher than \$25, in even dollars. The singsong jargon of the auctioneer continues incessantly as he passes from pile to pile, the buyers indicating their bids by nod, wink, gesture, or word. The auctioneer and clerk know the buyers and their methods of bidding and are able by long experience to proceed at high speed. When the sale is completed, the clerk writes the name of the buyer and the sale price on the tag and makes a duplicate record for the warehouse office. The farmer, dressed in his "Sunday best," is usually present for this ceremony and examines the price on the tag. If it is satisfactory, he proceeds to the office for his check; but if he feels his tobacco is worth more, he turns the tag and thereby rejects the sale. The tobacco, however, is semiperishable as it comes to the auction floor, and the grower risks possible deterioration if he holds his tobacco for too long a period of time.

If the sale is accepted, the tobacco is hauled to the buyer's "green prizing" rooms where it is packed in hogsheads and shipped promptly to a drying plant. Here the tobacco is brought to a uniform humidity, first by drying it almost to a crisp and afterwards restoring the moisture by passing it through steam chambers where the heat and moisture are carefully controlled. The tobacco is then packed in hogsheads again for storage and aging.

In all the principal markets, the large tobacco companies have buyers who move northward with the harvesting of the crop. These companies include the American Tobacco Company, R. J. Reynolds Tobacco Company, Liggett & Myers Tobacco Company, Imperial Tobacco Company, Ltd., P. Lorillard Company, and Export Leaf Tobacco Company, which is the buying agency of the British-American Tobacco Company, Ltd. The buyers are instructed by their head offices as to the grades and amounts to be purchased. The instruction as to amounts some-

¹ The pin-hookers are local tobacco experts who buy a pile of tobacco that they believe to be undervalued in the bidding, expecting to sell it later in the day to a leaf dealer or a manufacturer's representative.

times stipulates specific percentages of offerings of certain grades. The leaf dealers, in addition to buying for their own account, are of importance in the market since they frequently act as agents for tobacco companies that do not have their own buying organizations.

These leaf dealers usually sell their stock to importers in foreign markets and to smaller manufacturers in this country. Many of the leaf dealers have their own redrying plants and store the tobacco in hogsheads until it is sold. The largest of these leaf dealers is the Universal Leaf Tobacco Company, of Richmond. There are a number of smaller firms ranging from a concern such as Pemberton & Penn, of Danville, Virginia, which operates four branch offices and drying plants as well as two foreign offices, to the small dealer who is hardly more than a pin-hooker. In the past, in some of the smaller markets where the large companies did not send representatives, leaf dealers were often commissioned to purchase for the companies in that market. When the same dealer acted for several companies, the farmers complained that the price was unduly depressed because of the lack of competition. According to statements made by the principal companies, this practice has now been abandoned.

Obviously there are some definite advantages to the present system of marketing tobacco, but the complaints and criticisms concerning this system make it clear that it is not satisfactory to all. Tobacco men insist that each leaf of tobacco is different, and that the auction system permits individual appraisal of the farmer's crop by qualified buyers who know what they are looking for and will pay the necessary price to obtain it. The auction system permits the rapid handling of a large and perishable crop in thousands of individual transactions. The farmer receives his money promptly, and the tobacco can be quickly processed for storage by the company. It is undoubtedly true that an average day's price for a certain grade in a particular market is not far out of line with the average prices in other markets. On the other hand, in an individual transaction a farmer may be treated unfairly because the speed with which the transaction is completed may not permit all buyers in every case to examine each lot carefully. Although the farmer has some protection in being able to reject the sale, it is difficult for him to appraise his tobacco with any degree of certainty, and it is dangerous for him to hold the tobacco because of its perishability.

The unpopularity of the auction system with the farmers was one of the principal reasons for the rapid development and growth of the tobacco cooperatives in the early 1920's. During the same period two investigations were made by the government to determine the extent of the collusion, if any, that existed between the principal companies buying in the auction markets. Charges were made that the large buyers would not bid against one another, but that each would agree to take a certain percentage of the daily offerings. The growers believed that prices were artificially low because of such alleged agreements; no evidence was found, however, to sustain this belief. In the first investigation it was stated that "while opinions differ as to the existence of competition among buyers of leaf tobacco, and no conclusive evidence of collusion to bring about the decline (in tobacco prices) is at hand, attention should be called to the fact that in each of the chief growing areas the buying is centered in very few hands."¹

The later investigation found no additional evidence to support the charge of collusion and the report of the investigation stated that "the commission has found no evidence of illegal agreements, combination, or conspiracies between the American Tobacco Company and the Imperial Tobacco Company with respect to the buying and selling of tobacco and tobacco products."²

Government grading has been resorted to as one means of protection to the farmer. The Tobacco Inspection Act,³ which was passed in 1935, provided for the compulsory inspection and grading by Federal representatives of all tobacco sold in those markets where two-thirds of the growers favored such a plan. The grades determined by the government inspector were to be marked on each lot of tobacco after inspection and before the tobacco was sold. By 1939, free and mandatory inspection had been authorized for 34 markets. Federal inspectors handled more than 250,000,000 pounds of tobacco during the 1938-1939 season.⁴

Because of the sincere belief of the tobacco buyers that a lifetime is required to train the few men who have the knack of judging and grading tobacco accurately, the judgment of these

¹ U. S. Federal Trade Commission, *Report on the Tobacco Industry* (Washington, Government Printing Office, 1922), p. 54.

² U. S. Federal Trade Commission, *The American Tobacco Company and the Imperial Tobacco Company*, Senate Document No. 34, Sixty-ninth Congress, First Session, (Washington, Government Printing Office, 1926), p. 4.

³ 7 U. S. Code, Sec. 511 ff.

⁴ *Tobacco*, Vol. 108, No. 24, June 15, 1939, p. 21.

government inspectors is not valued by the tobacco companies. In the haste to provide inspectors within a short time, there is serious doubt that experienced men of adequate training could be obtained. Furthermore, as in the case of textile mills, certain qualities of tobacco sought for by some companies include characteristics not specified by government standards.

All in all, the auction method of selling tobacco seems to be the most feasible means of selling a perishable product that is difficult to grade and that must be sold in separate lots to a comparatively few buyers. While it is true that injustices to individual farmers may occasionally occur, in the absence of widespread collusion there is no reason to believe these injustices are more frequent than in the sale of other commodities. With the support of the warehouseman, the privilege of rejection, and the increase of impartial inspection by the government, the farmer will be less likely to be abused by this system. Complaints and charges may be expected when prices decline, because the farmer is ever ready to believe that the machinations of the buyers, rather than economic forces, cause lower prices for his product.

In the Baltimore hogshead market through which all Maryland tobacco is sold, the closed-bid auction prevails. The grower packs the tobacco in hogsheads on the farm and ships them either to the cooperative marketing association or to a broker. State inspectors sample the hogsheads and turn over the samples to the consignee, who displays them in his office. Buyers visit the various offices and submit sealed bids, which are opened at the close of the day. As pointed out previously, this is the last stronghold of a system which was formerly the principal method of selling tobacco.

Cigar leaf is sold on the farm in most districts growing this type of tobacco. A leaf packer, or his representative, or a representative of the cigar manufacturer visits the farms during the growing season and sometimes negotiates for the crop before it is harvested and cured. When the cigar leaf is not sold on the farm, the grower sometimes turns it over to a dealer or packer, who sorts, sweats, and packs the tobacco for sale.

TOBACCO COOPERATIVES

Cooperatives have been notably unsuccessful in the marketing of tobacco, although attempts have been made during every

period of declining prices to organize the farmers into effective bargaining groups. The emphasis throughout has been to raise prices that were considered to be too low because of the collusion of relatively few powerful buyers.

While sporadic attempts to organize cooperatives had been made before 1900, the first important cooperatives were the Dark Tobacco District Protective Association formed in Kentucky in 1904, and the Burley Tobacco Society established in 1907.¹ These organizations were formed to fix prices in order to prevent alleged exploitation of the growers by the American Tobacco Company, which at that time had a monopoly on the production of every type of tobacco product except cigars. Irresponsible elements in these associations, called "Night Riders," destroyed considerable property in attempting to enforce acreage restriction and punish nonmembers for marketing tobacco rather than pooling the tobacco and withholding it from the market. Peaceful methods were introduced by more responsible members with the result that in 1908 only 10% of the normal Burley acreage was planted, and production of dark-fired tobacco was reduced substantially.² The American Tobacco Company then agreed to purchase the 1906 and 1907 pools at increased prices. Despite the success of this plan, the strain of terrorism, along with the non-compliance, the increased acreage of nonmembers, and adverse court decisions, proved to be too much for the growers.³ So few promised delivery of their 1909 crop that they were released before the marketing season, and no pool was operated.

The tobacco cooperative movement was in a quiescent state until 1920, when the average price a pound for flue-cured tobacco dropped to 21.5 cents as compared with the 44.4 cents received the previous year; and Burley prices dropped from 32.7 cents to 13.8 cents. Cooperatives were formed the following year in Kentucky, North Carolina, Virginia, and Connecticut. The most important were the Burley Tobacco Growers Association, organ-

¹ Kentucky Agricultural Experiment Station, Bulletin No. 288, *The Cooperative Marketing of Tobacco* (Lexington, October, 1928), p. 274.

² Filley, H. C., *Cooperation in Agriculture* (New York, John Wiley & Sons, Inc., 1929), p. 250.

³ It was also charged that the American Tobacco Company paid higher prices for tobacco marketed outside the pool than for pooled tobacco. Kentucky Agricultural Experiment Station, Bulletin No. 202, *A Preliminary Study of the Marketing of Burley Tobacco in Central Kentucky*, by C. O. Bohannon and D. P. Campbell (Lexington, June, 1916), p. 201.

ized in 1921, and the Tobacco Growers Cooperative Association, known as the Tri-State Tobacco Growers, which handled flue-cured tobacco in North and South Carolina and Virginia.

Both of the latter organizations were formed on a basis antagonistic to the large buyers and to the existing marketing system. The growers considered that they had been suffering from ill treatment by a monopoly, and proposed to organize their own monopoly. While the organizations were successful and contributed in large measure to the 48.5% of total tobacco production marketed by cooperatives in 1922-1923,¹ they were never able to secure complete control of all tobacco handled.

Tobacco was withheld from market by the Burley association, and, as a consequence, producers were not paid promptly. The final payment on the 1922 crop was made in March, 1925, and the 1923 pool was not cleared until 1927.² Although some advances were made to farmers, this delayed payment encouraged non-compliance and discouraged solicitation of new members. Warehousemen were opposed to this movement, since the cooperatives were selling from their own warehouses and the volume of sales in auction warehouses was declining.

The Tri-State cooperative suffered from mismanagement when officers refused to sell to exporters and dealers "as a means of preventing resales on the auction markets."³ Some dealers had purchased tobacco from the cooperative, resold it on auction floors, and received higher prices than those paid the cooperative. This situation was embarrassing to the cooperative, which had been organized with the avowed purpose of replacing the existing method of marketing tobacco through auction warehouses.⁴ Another result of this policy was to divert the tobacco to the association's redrying plants in which 27 officials were financially interested.⁵ This latter association went into receivership in 1926, after handling only 5% of the tobacco crop of the three

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 6, *Statistics of Farmers' Cooperative Business Organizations, 1920-1935* (Washington, May, 1936), Table 38, p. 84.

² Kentucky Agricultural Experiment Station, Bulletin No. 288, p. 286.

³ U. S. Federal Trade Commission, *The American Tobacco Company and the Imperial Tobacco Company*, p. 8.

⁴ U. S. Department of Agriculture, Circular No. 100, *Business Analysis of the Tobacco Growers' Cooperative Association*, by John J. Scanlan and J. M. Tinley (Washington, October, 1929), p. 93.

⁵ U. S. Federal Trade Commission, *Report on the Tobacco Industry*, p. 9.

states in 1925.¹ Operations of the Burley association were discontinued in 1926 when the five-year contract submitted to the growers was not signed by a sufficient number of growers to achieve control of the 75% of the Burley crop necessary to make the contract effective.

These unsuccessful attempts at cooperation, along with rising prices, forestalled any additional activity until 1930, when prices again declined. Several cooperatives were established at that time. One of these, in South Carolina, handled 20% of the 1930 crop of that state; later it failed after encountering difficulties in selling tobacco.² In two states, Maryland and Wisconsin, cooperatives have operated satisfactorily for a number of years. In these two states the marketing system differs from that in the flue-cured, fire-cured, and Burley regions. In Maryland, the grower ships his tobacco to the Baltimore hogshead market where state inspectors sample the tobacco, and the cooperative displays these samples for the buyers to examine. In Wisconsin, the tobacco must be put through a sweating process before being packed, and storage facilities must be supplied for tobacco not sold immediately after packing. The Maryland Tobacco Growers Association has been functioning as a marketing organization since 1920. In the cigar leaf area of Wisconsin, the Northern Wisconsin Cooperative Tobacco Pool has been operating as a packer for its members since 1922. The amount of tobacco handled by these cooperatives is very small in proportion to the total crop. It was estimated that the total business of the 16 tobacco cooperatives amounted to \$7,500,000³ in the 1934-1935 marketing season, or approximately 3% of the farm value of the crop.

With the improvement in the system of auctioning tobacco, it is possible that the demand for tobacco cooperatives will decline. The unsuccessful attempts seem to indicate that the cooperative organization is not so well suited to the marketing of tobacco as it is to other agricultural commodities. To prove worth while, the cooperative must perform a business function better than private

¹ U. S. Department of Agriculture, Circular No. 100, p. 125.

² U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, *Cooperative Marketing of Agricultural Products*, by Ward W. Fetrow (Washington, February, 1936), p. 83.

³ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 6, *Statistics of Farmers' Cooperative Business Organizations, 1920-1935*, by R. H. Elsworth (Washington, May, 1936), p. 17.

individuals with private capital. In tobacco, specifically, the cooperatives must sell tobacco more efficiently and economically than auction warehouses. Past experience forecasts that this result will indeed be difficult to accomplish.

MANUFACTURE OF TOBACCO PRODUCTS

The processing of tobacco, as pointed out above, begins on the farm when the grower cures his crop by one means or another. This curing, however, does not prevent the tobacco's use in a considerable variety of blends for different tobacco products. As a consequence, the farmer brings his tobacco to the market confident that some manufacturer will buy it for one use or another. After purchase, the manufacturer or leaf dealer redries the tobacco and puts it into storage for mellowing.

The further processing of the tobacco depends upon its use. Since over half of the domestic consumption of tobacco is in the form of cigarettes,¹ the process of manufacturing this product will be described first.

The principal American tobaccos used in cigarettes are the Burley and flue-cured varieties. Other tobaccos, including Maryland and Turkish, are used in whatever proportions are required to produce the special blend.

Tobacco leaf is aged in the oak hogsheads for at least twelve months, and frequently longer, before it is ready for further processing by the manufacturer. Since each crop is slightly different in flavor and mildness, companies use tobacco from three to five different crops to maintain uniformity of blend. Tobacco companies are thus obliged to purchase stocks of tobacco at least two years ahead in order to be assured of an adequate supply of cured tobacco for processing. The cost of the leaf in inventory is, therefore, an average of at least two or more years' crops. This inventory requires a substantial investment by the tobacco companies; for example, the inventory of the American Tobacco Company usually is valued in excess of \$100,000,000. If demand has been underestimated, additional supplies may be secured from the leaf dealers, who carry stocks of tobacco in

¹ In 1935 a total of 776,000,000 pounds of tobacco was consumed in this country, of which 399,000,000 were used in cigarettes, 263,000,000 in smoking and chewing tobacco and snuff, and 113,000,000 for cigars. U. S. Department of Agriculture, Statistical Bulletin No. 63, p. 71.

various stages of aging and curing.¹ The leaf dealers also dispose of manufacturers' surplus stocks by selling the tobacco to other manufacturers who need additional supplies.

After the tobacco is aged and the staves of the hogsheads are removed, the packed tobacco retains the form of the containers until it is unpacked. The tobacco is then placed in steam chambers in order that moisture of an exact amount can be absorbed and the leaves made pliable for further processing. The stems or mid-ribs of the leaves are then removed by machines.² The leaves are checked by a corps of negro women to see that all stems are removed. These women also do by hand some stemming of leaves that cannot be stemmed properly by the machine. The sound of the negro spirituals harmoniously sung by these women at their work often rises above the clatter and confusion of the machinery.

After stemming, the leaves are sprayed with sauces of various flavors, which may include vanilla, rum, licorice, or maple. After the leaves are redried the tobacco is blended and mixed in large revolving drums so that the proportions of bright leaf or flue-cured, Burley, Maryland, and Turkish tobaccos required by the particular formula are thoroughly mixed. The cigarette manufacturers lay a great deal of emphasis on the blending of the tobacco and in the protection of the secret formulas used for their particular brands. The skill in blending and in producing a formula acceptable to the public taste is emphasized both in advertising and in conversations with the executives of these companies. It would be safe to say, however, that if a company were required to give up either its formula or its brand name, its managers would probably choose to relinquish the formula rather than the valuable brand name.

In "bulking," the next process after mixing, the tobacco is moistened again, placed in piles, covered with canvas sheets, and left for a day or so. This tobacco is then fed into the shredding machine, which consists of a series of rolls that compress the leaves and force them under the cutting blades. At this stage the tobacco is frequently sprayed with additional flavorings, particularly rum and glycerin or other hygroscopic (moisture-retaining)

¹ It is said that one large leaf dealer purchased a substantial part of the requirements for one crop year for a cigarette manufacturer who was short of working capital, and that he stored it and billed the manufacturer for it as it was used.

² In some cases, the tobacco is stemmed before being packed in hogsheads for the long period of storage.

agents. The shredded tobacco is again mixed and stored for two or three days or more.

The tobacco is then ready to be used in the manufacture of cigarettes. It is carried to the hoppers located above the automatic cigarette-making machines. As the tobacco flows from the hoppers, revolving cylinders spread it evenly on a moving belt, from which it passes onto the cigarette paper which passes below it as an apparently endless white ribbon equal in width to the circumference of a cigarette. The brand name has already been printed on the paper at appropriate intervals by a revolving wheel which presses against the paper as it unwinds. The tobacco and paper are shaped and rolled together. The edges of the paper are sealed by a thin coating of casein paste and the long white tobacco-filled tube thus produced is cut into cigarette lengths by a circular knife. The average rate of many machines now installed in cigarette factories is 700 to 800 cigarettes a minute and the newest automatic machines have a capacity of 1,200 cigarettes a minute.

As the cigarettes leave the machines, they are inspected and stored in magazines containing 4,000 cigarettes each. These magazines are carried to the packaging machines and attached as needed. The packaging machine automatically counts the cigarettes, rejects any that are damaged or of short length, wraps each lot of 20 in paper-backed foil and then in the outer paper wrapper, and attaches the revenue stamp. These machines have an output of 150 packages a minute. The packs thus made are delivered to wrapping machines which enclose them in cellophane. The packages are packed by hand in cartons of 10 packages each, and the cartons are packed in groups of 50 into containers for shipment.

The processing of tobacco preparatory to the manufacture of cigars is similar to that of tobacco destined for cigarettes. The tobacco is first cured and stored. When mild enough for use in cigars, the leaf is put in bulks for fermentation. The tobacco leaf must then be stemmed. For the binder and wrapper types of cigar tobacco, the leaf is split in the stemming process into two halves, known as the "left hand" and "right hand."

Considerable quantities of Sumatra wrapper tobacco are imported to the United States via the Amsterdam market, the total amounting to 1,750,000 pounds during the period from

July, 1935, to July, 1936. Some wrapper tobacco is also imported from the Philippines. Binder tobacco is supplied solely by the Connecticut, Wisconsin, New York, and Minnesota producing areas, while filler tobacco is supplied not only by the Pennsylvania, Ohio, and other domestic areas but also comes from Cuba, Puerto Rico, and the Philippines.

The mechanical process of making a cigar follows exactly the same steps as the hand process formerly used. The first automatic cigar-making machine was put into operation by Waitt & Bond in 1919.¹ Although some machinery had been installed previously which assisted the worker in increasing production, this was the first machine to perform all the operations necessary to produce the finished product. By 1933 it was estimated that over 80% of the cigars manufactured in this country were produced by machines.²

Four operators are required on the machine, which produces the finished cigars at a rate of approximately 480 cigars an hour. The first operator puts the filler leaves in a small trough at the side of the machine. These leaves are pressed into a compact bunch and then cut by a knife into the approximate size of a cigar. The machine next automatically checks the size and weight of each bunch and cuts it to exact size. In the meantime, the second operator has placed one "hand"³ of the tobacco to be used as a binder on the cutting form where it is held by suction. The mechanical cutter has dropped to cut the binder to exact size, has picked it up by suction, and placed it upon a perforated belt where it is also held by suction. A roller has applied gum tragacanth, a sealing agent, to the tip of the binder. The belt then drags the filler to the binder, which is held in a loop of the belt, and twirls the binder around the bunch. The cigar is then placed mechanically between two molds to shape the ends of the cigar, and from these molds passes to the spinning rollers.

The third operator places the wrapper on the cutting form where it is cut in a manner similar to the binder but in a different shape. The wrapper is then transferred by suction to the spinning

¹ Baer, Willis N., *The Economic Development of the Cigar Industry in the United States* (Lancaster, Pa., privately printed, 1933), p. 197.

² U. S. National Recovery Administration, Division of Review, Works Material #87, *The Tobacco Study, The Tobacco Unit* (Mimeographed, March, 1936), p. 168.

³ The machine can be adjusted so that either left "hands" or right "hands" may be processed.

rollers where a needle catches the end of the leaf and holds it to the revolving cigar until an overlap has been made. The cigar wraps itself as it turns around five or six times. A rotating two-blade knife cuts the wrapper to fit the end of the cigar exactly. The ends are then trimmed by a knife and the cigar is rolled around a cylinder to smooth the wrapper. The cigar has reached the opposite end of the machine by this time and is deposited in front of the fourth operator, who inspects it. After inspection the cigars are taken to the automatic wrapping machine for their bands and cellophane envelopes.

Formerly Cuban men were considered to be the only experts capable of making fine cigars by hand, and a large industry was established in Havana and in Tampa, Florida. The better-grade cigars are still rolled principally by hand, but in 1932 the American Tobacco Company transferred from Cuba to Trenton, New Jersey, the manufacture of its high-grade cigars, including the famous La Corona brand, sold under International Cigar brands by Henry Clay and by Bock & Company. Women were trained to roll cigars to replace the male cigar makers of Cuba, and officials of the company stated that the women workers were found to be more satisfactory than the former Cuban employees.

Smoking tobacco is usually referred to as pipe tobacco, but it is also used as "makings" for "roll-your-own" cigarettes. Burley is the most important type of tobacco used in the manufacture of smoking tobacco, although many other types are added to produce the variety of blends. The tobacco is blended, after stemming, as in the manufacture of cigarettes. The leaves are dipped in sauces and then granulated, flaked, or shredded, depending on the form in which the particular brand is sold.

In the manufacture of chewing tobacco the distinctive feature is the addition of sauces of flavoring which amount to from 25% to 50% of the weight of the tobacco. The principal forms of chewing tobacco are plug, twist, fine cut, and scrap. Plug tobacco consists of leaf tobacco properly flavored and pressed together, and wrapped with a light-colored leaf, mainly of flue-cured tobacco. The twist tobacco is pressed by twisting, either by hand or by machine. Fine cut is shredded by machinery and is similar to smoking tobacco except that it is treated with heavier and richer sauces. Scrap tobacco is made from cuttings from cigar manufacture and strips. Some brands are heavily sweetened.

The darker tobaccos, principally fire-cured, are used mainly in the manufacture of snuff. The tobacco used for snuff is cured for at least two years. It is dried, ground, sieved, and then aged by being packed tightly in barrels for from two to six months. The dry snuff is usually not flavored, but the moist snuff is richly flavored.

CONSUMPTION OF TOBACCO IN THE UNITED STATES

In 1937 the per capita consumption of small cigarettes in the United States was 1,258, the equivalent of 3.59 pounds of leaf tobacco. There were 42.8 large cigars, or 1.05 pounds, per capita consumed in the same year; and the per capita consumption of smoking tobacco was 1.80 pounds. The consumption for chewing tobacco during the same year was 0.53 pound per capita and for snuff, 0.28 pound per capita (see Exhibit 3).

EXHIBIT 3
PER CAPITA CONSUMPTION OF TOBACCO PRODUCTS IN THE
UNITED STATES, 1900-1937

Year	Number		Pounds of leaf tobacco					Total
	Large cigars	Small cigarettes	Cigars	Cigarettes	Chewing tobacco	Smoking tobacco	Snuff	
1900	70.5	34.9	1.33	0.14	2.39	1.31	0.20	5.37
1905	82.3	40.4	1.59	0.15	2.09	1.92	0.25	6.00
1910	76.7	93.7	1.59	0.34	2.17	2.30	0.34	6.74
1915	71.4	180.6	1.58	0.67	1.77	2.36	0.33	6.71
1920	79.8	418.8	1.87	1.56	1.43	1.98	0.34	7.18
1925	60.3	696.1	1.39	2.07	1.10	2.14	0.33	7.03
1930	50.1	972.0	1.17	2.73	0.80	1.87	0.33	6.90
1935	39.5	1,055.6	0.96	3.01	0.55	1.83	0.28	6.63
1936	42.0	1,192.7	1.03	3.40	0.55	1.86	0.29	7.13
1937*	42.8	1,258.2	1.05	3.59	0.53	1.80	0.28	7.25

* Preliminary.
Source: U. S. Department of Agriculture, Statistical Bulletin No. 58, Table 16, p. 100, and Statistical Bulletin No. 67, *Annual Report on Tobacco Statistics, 1938*, Table 23, p. 79.

The consumption of cigarettes has increased by leaps and bounds, especially during the last twenty years, and the smoking habits of the people have changed materially since the early days of the industry. In the closing days of the Civil War a farmer by the name of John Ruffin Green had been eking out a living by

producing and processing tobacco in a small North Carolina hamlet. There in Durham he cured bright leaf tobacco, flailed it by hand to granulate it, and then peddled it in surrounding communities. In April, 1865, the retreating Confederate Army of General Joe Johnston passed through Durham and appropriated part of Green's stock. A few days later, after General Johnston had surrendered to General William T. Sherman, the Union soldiers came to the little village, which was then only a siding on the railroad between Greensboro and Goldsboro, to await transportation home. While in Durham these soldiers appropriated the remainder of Green's stock of manufactured tobacco and carried it home with them. Later Green began to receive orders from both the northern and southern ex-soldiers for shipments of his tobacco. The taste of this tobacco, particularly in hand-rolled cigarettes, was pleasing to the smokers of the country and marked the beginning of the popularity of the flavor of bright leaf tobacco. With this impetus Green's business grew, and he chose the trade name, Bull Durham, to identify his product. Green died in 1869, but his partners advertised the brand on billboards and through the use of premiums, and the popularity of the brand became nation-wide.¹ The brand was popular for years, both as a smoking tobacco and as makings for hand-rolled cigarettes.

In the meantime, the future owner of the Bull Durham brand had become established in the tobacco business. In 1865, after the surrender of General Lee, Washington Duke returned to his farm outside Durham to find it stripped of all supplies save 200 pounds of bright leaf tobacco.² With the aid of his sons, the tobacco was beaten, sifted, and packed into bags. Duke set out in a wagon drawn by two blind mules to sell this tobacco in eastern North Carolina under the brand of Pro Bono Publico. The selling journey was successful and in a barn of the farm the tobacco business of W. Duke & Sons was begun. In 1874 the business was moved to Durham, where it expanded rapidly.³

James Buchanan Duke, the youngest son of Washington Duke, who was in charge of manufacturing, became restive because of the

¹ Boyd, W. K., *The Story of Durham* (Durham, Duke University Press, 1925), p. 68.

² Jenkins, John W., *James B. Duke: Master Builder* (New York, George H. Doran Company, 1927), pp. 44-45.

³ Boyd, *op. cit.*, p. 85.

success of Bull Durham and felt that his company should seek another field. During this period tobacco was consumed principally in the form of cigars, twist, or granulated tobacco for smoking either in pipes or in roll-your-own cigarettes, plug tobacco for either smoking or chewing, and fine-cut tobacco for chewing, snuff, and for the few handmade cigarettes that were produced in factories. Of these products J. B. Duke envisaged the cigarette as the tobacco product that could be developed, and in 1884 two newly invented machines, designed to roll cigarettes automatically, were installed in the Duke plant. Many problems had to be met before the machines could be operated effectively, but production was finally begun. The younger Duke contributed his share by inventing the "sliding box" to hold the cigarettes and to prevent their being crushed.

The Dukes were taking a long chance, since the few companies producing cigarettes were in a strong financial position and mechanical cigarette production had not been perfected. Luck was with them, however; the government reduced the tax on cigarettes and the Dukes reduced the price from 10 cents to 5 cents for a package of 10. By granting a special price which would allow the dealers to take advantage of the lowered price before the reduced tax became effective, the Dukes captured a large share of the market immediately. Cigarettes were the stepchild of the tobacco industry, however, and moralists were active in denouncing them and in proposing legislation which would prohibit their use.

Nevertheless, since J. B. Duke believed in the future of cigarettes he persuaded his father to permit him to establish a factory in New York and to direct the merchandising activities of the firm. Then Duke began the type of advertising for which the tobacco industry became famous. Pictures of actresses and prize fighters were included in each package, premium slips were enclosed which could be redeemed for various articles, and billboards proclaimed the merits of the Duke products. In one year the Dukes spent 20% of the gross income of the business in advertising.¹ The older tobacco firms with substantial financial resources unsuccessfully attempted to meet the competition of this aggressive promotional campaign. The alternative to their defeat was merger. Consequently, in 1890, the American Tobacco

¹ Jenkins, *op. cit.*, p. 91.

Company was formed by the five principal manufacturers of cigarettes, including W. Duke & Sons.

Cigars were the most popular tobacco product of the time, although chewing tobacco, as a less expensive product, was also popular. This chewing tobacco was manufactured in much the same way as it is today: it was pressed into flat pieces after being flavored with a sauce made of licorice, molasses, maple syrup, or other flavorings.

Pipe smokers also used this product, whittling slivers from the plug and tamping them into their pipes. About 1900, manufacturers began to cater to this market and sold the plug already sliced. From the slicing operation there was some wastage, such as the ends and sides of the plug and the leavings. Therefore, to utilize these, one manufacturer of the sliced plug, Patterson & Company (which was later purchased by the American Tobacco Company in 1905), granulated this wastage from its brand of sliced plug, Lucky Strike, packaged it, and sold it under the name Tuxedo. This product differed from the previously sold granulated tobacco, which had been dry, unflavored, and made principally of flue-cured tobacco, in that it was moist, flavored, and had a substantial proportion of Burley. The new product appealed to the palate of the consumer and was accepted immediately. Shortly afterwards the R. J. Reynolds Tobacco Company put out a similar product called Prince Albert.

By 1907 the production of smoking tobacco exceeded that of chewing tobacco.¹ In 1910 the production of smoking and chewing tobacco required 68.7% of the tobacco leaf consumed in this country, as compared with 24.7% which was used in cigars, 5.6% in small cigarettes, and less than 1% in small cigars and large cigarettes.²

After the dissolution of the American Tobacco Company in 1911,³ Liggett & Myers Company pushed actively the Fatima cigarette made from a blend of Virginia and Turkish tobacco, which was the first cigarette to be wrapped in foil and paper. Prior to this time cigarettes were usually sold in the sliding package invented by J. B. Duke. In 1912 Liggett & Myers Com-

¹ U. S. Commissioner of Corporations, *Report on the Tobacco Industry* (Washington, Government Printing Office, 1909), Part III, p. 47.

² Cox, Reavis, *Competition in the American Tobacco Industry* (New York, Columbia University Press), 1933, p. 44.

³ See p. 383.

pany introduced Chesterfield cigarettes, which were first made of straight Virginia tobacco but later included Turkish tobacco in the blend. In 1913 the R. J. Reynolds Tobacco Company introduced its Camel brand of cigarettes in a package similar to that used for Fatimas. Camels contained less Turkish and more domestic tobacco than Fatimas, and were highly flavored in a manner similar to that which the company employed in making its Prince Albert pipe tobacco. The Lucky Strike cigarette, introduced in 1916, was somewhat similar in flavor and named after the company's smoking tobacco brand. Camels and Lucky Strikes appealed to the pipe smokers who had been accustomed to the flavor of the plug slices.

The World War contributed in two ways to the popularity of these cigarettes. First, the free movement of Turkish tobacco to this country was prevented, and prices for this type of tobacco soared. Such high prices made it impossible for the manufacturers to sell cheap Turkish cigarettes or blended cigarettes that included a substantial amount of Turkish tobacco. The blended brands, including Camels, Lucky Strikes, and Chesterfields, all of which used a large proportion of domestic tobaccos, benefited from the high prices of Turkish tobacco. Furthermore, cigarettes were much more convenient than cigars or pipes for the use of the soldiers, and people were encouraged to send cigarettes to the front. The consuming public found that the taste of these brands was satisfactory, and the blends became firmly established in the domestic market by the end of the war.

Although total consumption of tobacco increased after the war, cigarette consumption increased at a relatively faster pace. This trend in cigarette consumption was given added impetus through the consumption of cigarettes by women. There was a general decline after 1920 in the consumption of cigars and of chewing and smoking tobacco, although the consumption of snuff remained more or less constant. There was, however, an increase in consumption of cheaper cigars after 1920. The cigar manufacturers apparently heeded Vice-President Marshall's advice that this country needed a good 5-cent cigar. The production of class A cigars, which are cigars retailing for 5 cents or less, increased from 15.4% of the total of all large cigars produced in 1918 to 87.6% of the total in the fiscal year ending June 30, 1937. This increase was due partly to price competition and advertising and

partly to the introduction of machinery that permitted automatic production of cigars.

PRINCIPAL COMPANIES IN THE INDUSTRY

The principal companies manufacturing cigarettes and smoking and chewing tobacco are today, with one exception,¹ the same as those created by the dissolution of the American Tobacco Company in 1911. The history of that company until 1911 was a continuation of the success story of James B. Duke. By 1890, because of the success of this enterprising young man, the four other important cigarette manufacturers were ready for an armistice. These companies were Allen & Ginter of Richmond, Kinney Brothers of New York City, W. S. Kimball and Brother of Rochester, and Godwin & Company of New York City. These four companies consolidated their manufacturing facilities with W. Duke & Sons to form the American Tobacco Company. James B. Duke, who was just 33, was elected president of this combination of companies. At the time of the merger these manufacturers were producing more than 90% of the total output of cigarettes in this country, although their proportion of the business in other tobacco products was considerably smaller. Duke was interested in acquiring companies producing other tobacco products. These acquisitions were slow at first, but in 1895 the business of P. Lorillard & Company, which was an important unit producing snuff and plug tobacco, was added to the American Tobacco Company. In the same year three companies producing small cigars, or tobacco-wrapped cigarettes, were acquired. Meanwhile, moral indignation at the paper-wrapped cigarettes, commonly referred to as "coffin nails," had reached a peak, and Duke prepared for the worst,² namely, complete prohibition of this type of product. Only two or three states, however, actually passed such laws.

No further acquisitions were made for several years, but in 1898 Duke made plans to combine the principal producers of plug tobacco. As a result, Liggett & Myers Tobacco Company and

¹ Philip Morris & Company Ltd., Inc., was not connected with the American Tobacco Company at any time.

² Duke acquired in one year the three companies producing "little cigars," or what were really tobacco-wrapped cigarettes, when it appeared that the sale of paper-wrapped cigarettes might be prohibited.

the R. J. Reynolds Tobacco Company, both important producers of plug, were brought into an affiliate of the American Tobacco Company which was called the Continental Tobacco Company. James B. Duke was president of this company also.¹ The American Snuff Company was formed in 1900 with the acquisition of the principal snuff companies in accordance with the policy of the American Tobacco Company of reaching for control of other types of tobacco products. By 1900 the American Tobacco Company and its affiliates produced 92.7% of the cigarettes manufactured in this country, 62.0% of the domestic plug and twist output, 59.2% of the smoking tobacco, 61.2% of the snuff, 50.5% of the fine-cut tobacco, and 4.8% of the domestic cigars.²

In 1901 the American Tobacco Company formed the American Cigar Company, consisting of companies with Cuban plants, although some American companies were acquired later. Because of the large number of independent manufacturers of cigars in existence, owing to the hand-rolling process of cigar manufacture and the small amount of capital required to open such a plant, the combination was never able to control more than one-sixth of the cigars produced in this country.³

In 1904 the American Tobacco Company, the Continental Tobacco Company, and the Consolidated Tobacco Company (a holding company) were merged under the original name of the American Tobacco Company. In the meantime the British-American Tobacco Company, Ltd., had been formed to share the world markets with the Imperial Tobacco Company, Ltd., the principal manufacturer in Great Britain.

Then came the "trust-busting" era. In 1907 the Department of Justice filed a complaint that the American Tobacco Company and others were maintaining a combination in restraint of trade. The testimony and the arguing of the case dragged on for several years. By 1910 the company had increased its hold on the American markets and was producing over 75% of the domestic manufacture of all types of tobacco products except cigars.

¹ One of the companies included in the combination, the Union Tobacco Company, had control of the old Bull Durham brand. Thus Duke finally acquired the competitor, formerly so powerful as to convince him that he should try another field, cigarettes.

² U. S. Bureau of Corporations, *Report of the Commissioner of Corporations on the Tobacco Industry* (Washington, Government Printing Office, 1909), Part I, pp. 327, 365, 383, 399, 408, and 418.

³ *Ibid.*, p. 423.

On May 29, 1911, the Supreme Court of the United States ordered the American Tobacco Company to dissolve.¹ The Court remanded the case to the Circuit Court of Appeals "for the purpose of ascertaining and determining upon some plan or method of dissolving the combination." The Circuit Court issued its decree in November in a plan designed to eliminate the possibility of a monopoly over any type of tobacco product and to reduce the widespread control by a small group of stockholders.²

The domestic tobacco business of the American Tobacco Company was divided into four companies: Liggett & Myers Tobacco Company (a new organization), P. Lorillard Company (a new organization), R. J. Reynolds Tobacco Company (an existing corporation), and the American Tobacco Company.³ The proportion of business by the various tobacco products was divided among these companies so that none would have a monopoly of any product. The American Snuff Company was divided into three companies, the existing corporation and two new companies, George W. Helme Company and the Weyman & Bruton Company. The Porto Rican-American Cigar Company was separated from the American Cigar Company, as was the Federal Cigar Company and the American Stogie Company. The licorice and tinfoil monopolies were also separated into new companies. Cash or stock was paid to the American Tobacco Company for the sale of these assets and then distributed to the shareholders of the company. The interest of the American Tobacco Company in the British-American Tobacco Company and in the United Cigar Stores Company was also terminated.

Those interested in the partition did not, of course, foresee the tremendous increase in the consumption of cigarettes that was to come later. The division of the cigarette business by brands resulted in distribution to the various companies as follows: American Tobacco Company, 37.11% of the total volume produced; Liggett & Myers Tobacco Company, 27.82%; P. Lorillard

¹ *United States v. The American Tobacco Company, et al.*, 221 U. S. 106, 31 S. Ct. 632.

² 191 Federal Reporter 371.

³ 191 Federal Reporter 392. The names of Liggett & Myers and P. Lorillard were picked since they were well known in the trade, although they had no direct connection, either by organization or brands owned, with the earlier companies of the same name. R. J. Reynolds was still an operating organization, and this decree divorced this company from the parent company in addition to specifying the brands it would own.

& Company, 15.27%; other companies not connected with the combination, 19.80%.¹ The R. J. Reynolds Tobacco Company was given no cigarette brands because this company manufactured only chewing and smoking tobacco. P. Lorillard & Company was given certain of the popular Turkish brands which were the consumers' favorites at that time.

With the introduction of Camels by the R. J. Reynolds Tobacco Company, hardly more than a year after the dissolution, the promotion of cigarettes was begun in earnest. Chesterfields, manufactured by Liggett & Myers, and Lucky Strikes, made by the American Tobacco Company, were the other two making up the "Big Three" of cigarettes, and these have dominated the market for over twenty years. A seesaw struggle during which each of the brands has led the others has been waged by means of large appropriations for advertising.²

These three brands constitute today approximately 80% of all cigarette sales in this country. Ranked behind them are the following brands: Philip Morris, a comparatively new brand made by Philip Morris & Company, Ltd., Inc.; Old Gold, manufactured by P. Lorillard & Company; Raleigh, made by Brown & Williamson, a subsidiary of the British-American Tobacco Company; and Kool, a mentholated cigarette. The 10-cent cigarettes such as Wings, produced by Brown & Williamson, and Twenty-Grand, produced by the Axton-Fisher Tobacco Company, also account for a small proportion of the total cigarette sales.

In 1938 gross sales of the four principal companies were as follows: *R. J. Reynolds Tobacco Company*, \$282,265,015;³ *American Tobacco Company*, \$253,096,222;⁴ *Liggett & Myers Tobacco Company*, \$237,764,151;⁵ *P. Lorillard & Company*, \$73,884,080.⁶

The *General Cigar Company*, which manufactures the White Owl brand, is the largest producer of cigars in this country. The *American Tobacco Company*, and its affiliate, the *American Cigarette & Cigar Company* (successor to the American Cigar Company) are next in importance. Brands of these companies include Cremo, Chancellor, and El Roi Tan, while the most famous is

¹ 191 Federal Reporter 392.

² See p. 386.

³ As reported to the Securities and Exchange Commission.

⁴ Annual Report, Feb. 28, 1939.

⁵ Annual Report, Jan. 13, 1939.

⁶ As reported to the Securities and Exchange Commission.

Corona. Another important cigar manufacturer is the *Porto Rican-American Tobacco Company*, which in September, 1939, for the purpose of adjusting its fixed charges, was in the process of reorganizing under the Chandler Bankruptcy Act. This company formerly manufactured some of its cigars in Puerto Rico but moved its machines to its Newark plant in 1937. It owns a controlling interest in *Congress Cigar Company*, and from 1929 to 1939 controlled *Waitt & Bond*, whose principal brand is the Blackstone cigar. Other cigar manufacturers include *P. Lorillard & Company*, *Bayuk Cigars, Inc.*, and *Consolidated Cigar Corporation*.

The four principal companies whose sales figures are given above are still the leading producers of smoking and chewing tobacco. Other important companies include *Larus & Bro. Company* (manufacturers of Edgeworth brand), the *United States Tobacco Company*, and *Brown & Williamson*. A large number of small independent companies also manufacture pipe tobacco of special blends.

The principal manufacturers of snuff are still the *American Snuff Company* and *George W. Helme Company*, both of which were established in 1911 by the decree, and the *United States Tobacco Company*, successor to the third company, the Weyman & Bruton Company. Each of these companies was given brands and types which were popular in particular territories and which are still in use. The relatively unchanging per capita consumption of snuff has meant that these companies have had a steady flow of business throughout the years.¹

ADVERTISING AND SALE OF TOBACCO PRODUCTS

James B. Duke set the advertising pace for the tobacco industry, and his successors have continued to advertise heavily the machine-made cigarette which Duke introduced to American consumers. Present-day advertising methods were really begun in 1926, when George Washington Hill, president of the American Tobacco Company, decided to concentrate nation-wide attention

¹ It is interesting to note that, of the eighteen companies listed on the New York Stock Exchange that earned and paid dividends without reduction from 1929 to 1938, four were tobacco companies, and three of these four were the American Snuff Company, George W. Helme Company, and the United States Tobacco Company, successor to the Weyman & Bruton Company. *Time*, Aug. 8, 1938, p. 42.

on the Lucky Strike cigarette which had been his particular interest since its introduction. Although there were many cigarette brands in the American Tobacco Company's line, this was the first time that the company had decided to feature a single brand. The advertising of the Lucky Strike brand was also the first attempt on the part of a tobacco company to introduce a simultaneous nation-wide campaign in newspapers, although national billboard advertising had been used previously along with occasional campaigns in selected newspapers. P. Lorillard & Company introduced its Old Gold brand at approximately the same time, also utilizing national advertising.

The radio was added as another advertising medium and both Old Gold and Lucky Strike cigarettes were praised through the microphone. Mr. Hill also began controversies, which still exist, first by using testimonials of people in the public eye, and secondly by using the slogan "Reach for a Lucky instead of a sweet." This latter campaign was subtly directed at the ladies, since even Mr. Hill did not dare at that time to offend public taste by using advertising directed specifically to women. These campaigns were apparently a success, for competitors increased their advertising appropriations, and by 1930 Lucky Strikes were outselling Camels.

The manufacturers of Camels conducted an aggressive campaign in 1930 featuring the Humidor Pack, as they were the first to wrap package cigarettes in cellophane wrappers rather than in the glassine paper formerly used. Other companies followed suit with variations such as "tab tops," which were introduced on Lucky Strikes. In 1932, when the R. J. Reynolds Company abandoned newspaper advertising for nine months, Camels lost considerable ground. In 1933 and 1934, when Liggett & Myers carried on an aggressive campaign directed specifically at women smokers, Chesterfields outsold Camels by a small margin. In 1934 Chesterfields were the most popular cigarettes. The tobacco dealers believed that this campaign not only increased the number of women smoking Chesterfields but that the women probably influenced men to smoke this brand. No doubt such advertising also increased the total consumption of cigarettes among women. In the meantime, in 1933, the R. J. Reynolds Tobacco Company had resumed newspaper advertising, and in 1934 the company had made even larger appropriations for this

purpose, with the result that Camels were regaining some of the market lost in 1932.

During this period not all cigarette competition was among the Big Three. In June, 1931, following the increase from \$6.40 to \$6.85 in the wholesale price for 1,000 cigarettes (see Exhibit 4), the way was opened for cheaper cigarettes to obtain part of the depression market. Estimates of the consumption of all 10-cent brands of cigarettes placed the figure at 12.5 billion to 13 billion in 1932, or approximately 12% of the total number of cigarettes consumed.¹ The consumption of "roll-your-own" cigarettes also increased during the depression. From the sales volume of packages of cigarette paper, it was estimated, probably rather generously, that in the year ending June 30, 1933, over 50 billion cigarettes of this type were consumed, or half as many as the total number of machine-made cigarettes.² This figure of 50 billion is comparable to an estimated consumption of 12 billion for 1929.

EXHIBIT 4
CHANGES IN MANUFACTURERS' PRICES OF LEADING CIGARETTE BRANDS
1919-1939
(In dollars per thousand)

Date	Gross	Net*	Federal tax	Net to manufacturer
1919—Nov. 24.....	\$8.00	\$7.06	\$3.00	\$4.06
1922—Jan. 23.....	7.50	6.63	3.00	3.63
Mar. 8.....	7.20	6.35	3.00	3.35
Aug. 1.....	6.80	6.00	3.00	3.00
Oct. 1.....	6.40	5.64	3.00	2.64
1928—April 23.....	6.00	5.29	3.00	2.29
1929—Oct. 21.....	6.40	5.64	3.00	2.64
1931—June 24.....	6.85	6.04	3.00	3.04
1933—Jan. 2.....	6.00	5.29	3.00	2.29
Feb. 11.....	5.50	4.85	3.00	1.85
1934—Jan. 9.....	6.10	5.38	3.00	2.38
1937—Jan. 20.....	6.25	5.51	3.00	2.51
1939†.....				

* After 10 % and 2 % discounts.

† 1939 prices still in effect.

Source: Cigarette Manufacturers' Price Lists.

¹ There are no official estimates of cigarette consumption by brands, but various agencies estimate consumption on the basis of tax-paid withdrawals by states, reports by dealers, and sales in the larger chain stores.

² U. S. Congress, House of Representatives, Hearings Before a Subcommittee of the Committee on Ways and Means, *Tobacco Taxes* (Washington, Government Printing Office, 1934), Testimony of Junius Parker, p. 116.

Early in January, 1933, the American Tobacco Company reduced the wholesale price a thousand from \$6.85 to \$6.00, and a month later to \$5.50. Other companies followed promptly, and the popular brands were then sold at retail for the price of two packages for 25 cents or less. In 1933 it was estimated that the consumption of the 10-cent brands amounted to approximately 8.5 billion to 9.5 billion cigarettes. In 1934, 13 billion of the 10-cent brands were sold, but in 1935, after increases in leaf tobacco prices and processing taxes had decreased the margin on 10-cent cigarettes and when consumers were willing to pay higher prices for cigarettes, these brands were not so important in the market. In 1938, however, the depression-born cigarette took on new life, and sales increased again as some consumers turned to the cheaper cigarette.¹

Competition from another quarter arose from the sale of mentholated cigarettes such as Spuds, manufactured by the Axton-Fisher Company, and Kools, manufactured by Brown & Williamson. The demand for these cigarettes increased noticeably after 1930, reached a peak in 1936 and 1937, and then declined. Maximum consumption of these cigarettes never exceeded 4 billion, however, and they were not considered a serious threat to the major brands.

A newcomer to the ranks was the Philip Morris brand of cigarettes, which was introduced in 1933 to retail for 15 cents a package.² This cigarette was produced by Philip Morris & Company and called an "English blend." It included somewhat less Burley and more bright leaf tobacco than the Big Three blends. Also, instead of the glycerin which was used as the hygroscopic (moisture-retaining) agent in most cigarettes, Philip Morris used diethyleneglycol, which, it claimed, produced fewer irritants when burned than glycerin. This brand met with immediate approval; the company sold an estimated 2.8 billion cigarettes in 1934 and 4 billion in 1935. This growth was phenomenal in a market where large manufacturers were supposed to be well entrenched. In 1938 this cigarette pushed Old Gold out of fourth place in the industry.³

¹ *The Wall Street Journal*, Mar. 19, 1938, p. 5, and July 2, 1938, p. 2.

² The success of the Philip Morris company in maintaining the retail price at 15 cents per package is a long and interesting story, achieved principally by direct contact with the dealers. Dealers were able to secure a higher margin, since the list price of Philip Morris from 1933 to 1938 was \$6.85 per thousand.

³ *Fortune*, Vol. 18, No. 2, August, 1938, p. 76.

Faced with the competition from Philip Morris and the other new brands, as well as that from the larger companies, P. Lorillard & Company began to stimulate the sales of Old Golds by introducing in 1937 a new type of cigarette advertising. The company sponsored through the leading newspapers a puzzle contest with \$100,000 as first prize and thousands of dollars in smaller prizes. Contest entrants were required to send the wrappers from Old Gold packages with their answers. The sales volume of Old Gold cigarettes in that year was estimated at 10 billion, almost twice as great as the volume of the preceding year. Sales dropped abruptly at the termination of the contest, however, and another contest of a similar nature failed to stimulate sales materially.¹

These flurries did not affect the dominant position of the Big Three, which continued to fight, by advertising, to maintain their position in the market. Total cigarette consumption increased materially in 1936 and 1937, and consumption of all three of these brands increased. Lucky Strikes moved up and in 1938 were in second place; Camels were leading, and Chesterfields were in third place.²

In addition to the volume of advertising which exerts such a tremendous pressure on consumers, the companies direct a great deal of attention to the wholesalers, jobbers, and dealers, since the great quantities sold require distribution through every available outlet. The distribution of tobacco products has changed with the increase in popularity of cigarettes, and the old-time tobacconist whose corner store was marked by the presence of a wooden Indian with a fistful of cigars is no longer the exclusive distributor of tobacco. The grocery, drug, department stores, and news stands are now important factors, especially in the distribution of cigarettes.

The tobacco companies employ salesmen to visit jobbers, wholesalers, and retailers, but sales are billed only to customers who are classified as wholesalers or jobbers and are thus entitled to the standard discounts of 10% and 2%.³ In a few instances certain large retailers, such as the drug, grocery, or tobacco chains, or large department stores, have a large enough volume of ciga-

¹ *The Wall Street Journal*, June 8, 1938, p. 3.

² *Ibid.*

³ These discounts have come to be used as a convenient method of quoting prices in terms of the list price. Originally the 10% was given to large buyers and the 2% discount was given for cash payments within 10 days.

rette sales to be termed wholesalers, a classification that permits them to buy direct from the manufacturers at the full wholesale discounts. The average retailer usually buys from the wholesaler at 9% off the manufacturer's list price, while the subjobber usually buys at 10% and 1%.

The salesmen visit retail outlets frequently despite the fact that the companies do not sell direct. Most of the salesman's work with retailers consists of arranging counter displays and dealer helps, listening to customers' or retailers' comments, checking the sales of his company's brand, and attempting to retain the goodwill of the retailer. In many retail stores, window displays are provided once a month. The cigarette manufacturers usually supply a window-dressing concern with lithographed displays and crepe paper, pay the concern an agreed sum for each window, and pay the retailer, either in cash or in free goods, for the use of the space. In the larger outlets the window space is shared by the companies on a weekly schedule.

The salesmen make direct contact with consumers only in sampling campaigns when cigarettes are given away free. Frequently college students are appointed as representatives to distribute samples. In 1928 a free package of 50 Old Golds was sent to every senior in college in the United States; Lucky Strikes have been "sampled" on various occasions; and Philip Morris cigarettes have been given away from time to time during the past few years in small packages containing two cigarettes.

The prices for cigarettes vary in the retail outlets. In the past some stores have used cigarettes as "loss leaders"; in one instance the price was as low as 60 cents a carton, equal only to the government tax. Until 1925 manufacturers usually gave "free deals," such as a free package with every carton purchased, which reduced the price somewhat. At the present time, free deals are given only occasionally and then only on smoking or chewing tobacco or minor cigarette brands. The system used most frequently to encourage the purchase of a particular brand of smoking tobacco is to offer at a greatly reduced price an additional item, such as a pipe, a pouch, or a container, when purchased with the tobacco. Not all retailers are offered these special deals, the choice being left to the salesman. When the company's salesman completes his calls on the selected retailers, the whole transaction is cleared through the wholesaler, although the latter has no part in the trade

except to be billed by the tobacco company and to collect from the retailers.

TAXES ON TOBACCO PRODUCTS

The Federal government has more than a half interest in the sale of every carton of cigarettes by the manufacturer to the wholesaler. For the last twenty years there has been a tax of \$3 per thousand on cigarettes weighing not more than 3 pounds a 1,000. In 1933 an attempt was made by the leading cigarette manufacturers to have cigarette taxes reduced from \$3 to \$1.80. This agitation was a countermove to the proposal by the manufacturers of 10-cent cigarettes that taxes be levied according to resale prices as were cigar taxes, a method of taxing which, of course, would have materially benefited the manufacturers of the 10-cent varieties. No change was made, however, and taxes remained just as they had been in the Revenue Act of 1919. The receipts from Federal taxes on various tobacco products in recent years are shown in Exhibit 5.

EXHIBIT 5
FEDERAL RECEIPTS FROM TAXES ON TOBACCO PRODUCTS, FISCAL
YEAR ENDED JUNE 30, 1935-1938

Product	1935	1936	1937	1938
Large cigars.....	\$ 11,692,859	\$ 12,227,751	\$ 13,246,959	\$ 12,750,915
Small cigars.....	143,739	133,244	144,866	130,994
Large cigarettes.....	17,318	18,784	19,238	21,186
Small cigarettes.....	385,459,571	425,486,471	476,027,207	493,432,960
Chewing and smoking tobacco.....	54,372,414	55,412,760	55,037,541	53,982,098
Snuff.....	6,511,662	6,603,039	6,659,509	6,678,854
Cigarette papers and tubes.....	976,068	1,282,024	1,116,377	1,182,539
Miscellaneous.....	4,994	1,665	2,448	2,422
Total.....	\$459,178,625	\$501,165,728	\$552,254,145	\$568,181,968

Source: U. S. Department of Agriculture, Statistical Bulletin No. 67 (Washington, Government Printing Office, 1938), p. 107.

By 1937, 20 states had imposed taxes on cigarettes ranging from 1 cent to 4 cents for a package of 20, in addition to the Federal tax.¹ Even the municipalities could not resist the temptation to allow the dealers and manufacturers to collect painless

¹ U. S. Department of Agriculture, Statistical Bulletin, No. 63, p. 108.

taxes for them. New York City, for example, imposed a tax on cigarettes in May, 1938, to raise funds for relief.

The taxes on other tobacco products are a much smaller percentage of the retail price. In 1938 the Federal tax on smoking and chewing tobacco and snuff was 18 cents a pound, or approximately 4% to 8% of the retail price. On class A cigars retailing for 5 cents each or less, the Federal tax was \$2 a thousand; on class B, selling at 6 to 8 cents each, \$3 a thousand; on class C, selling at 9 to 15 cents, \$5 a thousand; on class D, from 16 to 20 cents, \$10.50 a thousand; and on class E, selling at more than 20 cents each, the tax was \$13.50 a thousand.

GOVERNMENT CONTROL OF TOBACCO PRODUCTION

Before the tobacco adjustment program authorized by the Agricultural Adjustment Act¹ was put in operation, the 1933 crop had been planted, and some of the markets in south Georgia had opened for the sale of the harvested tobacco. Prices were no higher than in 1932, and the crop was estimated to be unusually large. There were many complaints from the farmers, and as the marketing season moved northward, complaints became more numerous, for prices continued at low levels. Finally, in September, several days after the North Carolina markets opened, the Governor of that state and the Governor of South Carolina declared a "voluntary marketing holiday," and the markets were closed. A campaign was started immediately by Agricultural Adjustment Administration agencies to persuade all farmers to sign an agreement to reduce their tobacco acreage in 1934. Within a week 95% of the farmers in the flue-cured regions had agreed to reduce the 1934 crop by 30%.

During this time the Agricultural Adjustment Administration was conducting negotiations with the tobacco companies in an attempt to establish an agreement regarding the price to be paid for the 1933 tobacco crop. The tobacco companies were willing to cooperate, but wanted in the agreement a paragraph to the effect that "the undersigned companies are to manage, conduct, and operate their businesses with freedom of policy as heretofore."² The fact that a large percentage of farmers had signed up with

¹ Seventy-third Congress, Public No. 10.

² Rowe, Harold B., *Tobacco under the A.A.A.* (Washington, The Brookings Institution, 1935), p. 112.

the Agricultural Adjustment Administration for reduction of the 1934 crop was helpful to the government in persuading the companies that higher prices would not encourage increased acreage in tobacco during the following season.

Difficulties were finally settled and an agreement was reached. Typical of the agreements was that signed by the buyers of flue-cured tobacco. It was important that this agreement be signed as soon as possible, not only because it would affect the largest number of farmers, but because flue-cured tobacco was marketed earlier than any other type of tobacco. Under this agreement the manufacturers agreed to purchase, between September 25, 1933, and March 31, 1934, an amount of tobacco equivalent to the amount that they had manufactured in the previous year, and to pay an average price of 17 cents a pound, which was considerably higher than the prices of 10 cents and 12 cents offered at the opening of the markets.¹ Inasmuch as about 75,000,000 pounds had been purchased before the markets closed, carrying out this agreement meant a substantial increase over the previous year both in the purchases of tobacco and in price. The exporters did not sign the agreement, and domestic manufacturers agreed that the exporters should not have to sign it.² A favorable exchange situation, however, permitted the exporters to pay the same prices as the domestic manufacturers when the tobacco was sold in the warehouses.

Tobacco was one of the seven basic commodities included in the Agricultural Adjustment Act of 1933. The Agricultural Adjustment Administration handled the adjustment programs of the six types³ of tobacco separately.

Tobacco differed from other commodities included under the Agricultural Adjustment Act in that the period used for determining the parity price was from August, 1919, to July, 1929, rather than the 1909-1914 period used for other commodities; the later years were considered more significant because of the important increases in consumption which had taken place. Another

¹ Rowe, *op. cit.*, p. 114. The purchases were to be made "in the usual and ordinary manner," that is, in auction warehouses, and assessments were to be levied against any contracting buyer who purchased less than the total agreed to, or at a price that brought that buyer's average below 17 cents.

² Exporters were afraid that foreign buyers, particularly the government monopolies, would not purchase tobacco under a rigid price-control scheme.

³ Cigar leaf, flue-cured, Maryland, Burley, dark air-cured, and fire-cured tobacco. See p. 355.

aspect of the tobacco problem in 1933 was also different from that of other commodities since there were only a few manufacturers of tobacco products as compared with the many manufacturers of wheat and cotton products. The fact that these few manufacturers had earned more profits in 1932 than the tobacco farmers had received for their entire crop was cited as one of the reasons why an adjustment program in tobacco was necessary.

In general, all the programs for the six types of tobacco involved a reduction in acreage in return for benefit payments. The benefit payments were to be supplied by processing taxes which ranged from 1.7 cents a pound of farm sales weight for Maryland tobacco to 4.2 cents a pound for flue-cured tobacco. These restrictions were crystallized in the Kerr-Smith Tobacco Act,¹ which was modeled after the Bankhead Cotton Control Act. The Kerr-Smith Act was approved in June, 1934, and provided for the levying of a tax of not less than 25% and not more than 33⅓% of the sale price of all tobacco covered by a production-adjustment contract. The act was specifically designed to prevent nonsigners from benefiting from the increased prices achieved by the reduction of the crop. Nontransferable tax-payment warrants were issued to each producer operating under a production-adjustment contract.² These warrants were to be accepted as payment for the tax when the grower marketed his crop. The warrants were valid only for an amount not exceeding the grower's quota. In contrast with the Bankhead Act, which intended to force all farmers into the production-adjustment plan by the application of a tax of 50% on all cotton produced in excess of the quota, the Kerr-Smith Act apparently intended to tax the profits of the noncomplier only, in order to equalize the positions of those who cooperated and those who did not.

The growers' incomes in 1933 and 1934 were apparently increased by the operations of the Agricultural Adjustment Act, both from the benefit payments and from the higher prices resulting from restricted supplies.³ The government accomplished by

¹ Seventy-third Congress, Public No. 483, 48 Stat. 1275.

² In addition, the act provided for the issuance of such warrants to nonsigning growers in each county up to an amount equal to 6% of the poundage covered by warrants to those growers signing the contracts. At least two-thirds of these warrants were required to be issued to growers whose allotments were 1,500 pounds or less. This provision was included to allow ineligible growers or growers whose quota was not equitable to secure adjustments. Rowe, *op. cit.*, p. 25.

³ *Ibid.*, p. 225.

legislation what the early cooperatives had attempted and failed to do. Prices were somewhat lower in 1935, although still more than double the prices that prevailed in 1932 and before the markets closed in 1933. In January, 1936, the Agricultural Adjustment Act was declared unconstitutional, and shortly afterwards the Kerr-Smith Act was repealed. Attempts were made to have the tobacco-growing states pass separate bills to continue the control program under the United States Supreme Court's interpretation of the constitutionality of production adjustment. An enabling act was passed by Congress which permitted states to form compacts to control the production of tobacco by the establishment of marketing quotas. Virginia actually passed such a law, but other states did not follow, and this plan was shelved.

The tobacco farmers were later eligible to receive payments, under the Soil Conservation Act, for diverting tobacco land to the production of soil-conserving crops. During 1936 payments were made for reductions not in excess of 30% of the base acreage. Through these payments the acreage for the entire country was reduced by approximately 25%.¹ Farmers were eligible to receive payments for soil conservation in 1937, but acreage was increased substantially. In 1937 production was above the average for the preceding ten years; prices were lower than in 1936.

Tobacco was included as one of the commodities to be controlled under the provisions of the Agricultural Adjustment Act of 1938.² The authority delegated to the Secretary of Agriculture for the control of tobacco production was very similar to that for cotton,³ except that no provisions were made for loans on tobacco.

National marketing quotas were to be applied whenever the total supply exceeded the reserve supply. The reserve supply was defined as normal supply plus 5%, the normal supply being a "normal year's domestic consumption and exports plus 175 per centum of a normal year's domestic consumption and 65 per centum of a normal year's exports." Quotas were to be allotted to the states on the basis of the average production of tobacco during the preceding five years, and farms were to be allotted their quotas by local committees. A penalty of 50% of the market price was to be paid for any tobacco sold in excess of the quota.

¹ U. S. Department of Agriculture, Statistical Bulletin No. 63, p. 110.

² Seventy-fifth Congress, Public No. 430, Subtitle B, Part I, Sections 311-314.

³ See Chapter IV, "The Cotton-Textile Industry."

Although the act provided for a referendum of the growers to determine their approval of the quotas, and quotas were voted for 1938, there was considerable dissatisfaction on the part of the growers. The allotments were called unreasonable; and inasmuch as the south Georgia markets opened with good prices, growers secured an injunction restraining the collection of the penalty taxes.¹ North Carolina and Virginia farmers joined together to raise funds to finance court proceedings before the markets opened in those areas.

In March, 1939, the Supreme Court of the United States upheld the Agricultural Adjustment Administration in its application of tobacco marketing quotas.² The court ruled that regulation of marketing was valid under the commerce clause of the Constitution. Prior to this time, however, the tobacco growers voted in a referendum on quotas for the 1939 marketing season. Because fewer than two-thirds of the growers voiced their approval of the application of quotas for the coming season, no quotas were applied for the 1939 season.

INTERNATIONAL TRADE IN TOBACCO

Since the flavor of tobacco varies with the soil on which it is grown and since tobacco is raised in all parts of the world, there is considerable commerce to provide blending tobaccos. While the United States is one of the principal tobacco producing and manufacturing countries, considerable amounts of tobacco are imported, and as much as half of the flue-cured crop has been exported. United States imports and exports of all types of tobacco are shown in Exhibit 6, and the principal types of American tobacco exported are shown in Exhibit 7.

The United Kingdom is the principal importer of American tobacco, receiving approximately half the total exports of this country. It imports more flue-cured than any other variety of tobacco and takes two-thirds of our exports of this type of tobacco. China was formerly an important market for this tobacco also, but the introduction of American seed and curing methods in China has substantially reduced the volume of tobacco exports to that country.

¹ *New York Herald Tribune*, July 28, 1938, p. 1.

² *Mulford v. Smith*, 59 S. Ct. 648.

EXHIBIT 6

UNITED STATES IMPORTS AND EXPORTS OF LEAF TOBACCO, 1910-1938
(In thousands of pounds)

Year	Exports	Imports
1910	328,562	42,343
1915	433,673	41,304
1920	479,900	82,221
1925	477,488	77,690
1926	487,058	67,906
1927	511,868	102,754
1928	583,846	74,797
1929	565,902	68,066
1930	579,704	71,543
1931	524,472	74,452
1932	411,159	56,905
1933	438,936	57,253
1934	440,866	57,786
1935	396,330	63,296
1936	425,269	67,519
1937	434,796	68,654
1938*	489,074	68,035

* Preliminary.

Source: For years 1910-1935, U. S. Department of Agriculture, Statistical Bulletin No. 58, pp. 103-107. For 1936, 1937, and 1938, U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Tobacco Division, *Tobacco Markets and Conditions Abroad*, Vol. 14, No. 10, Mar. 7, 1939, p. 121.

EXHIBIT 7

EXPORTS OF UNMANUFACTURED TOBACCO FROM THE UNITED STATES
1936-1938
(In thousands of pounds)

Variety of Product	1936	1937	1938*
Flue-cured.....	315,943	327,696	385,219
Burley.....	10,469	10,419	11,749
Dark-fired Kentucky and Tennessee.....	49,473	52,663	48,354
Dark Virginia.....	9,333	9,638	8,545
Maryland and Ohio Export.....	6,100	5,321	4,509
Green River (Dark air-cured).....	3,577	2,061	3,592
One-Sucker (Dark air-cured).....	818	219	494
Black Fat and Water Baler.....	10,297	8,693	7,699
Cigar Leaf.....	649	921	2,530
Perique.....	151	128	143
Stems, Trimmings, and Scrap.....	18,459	17,037	16,239
Total.....	425,269	434,796	489,074

* Preliminary.

Source: U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Tobacco Division, *Tobacco Markets and Conditions Abroad*, Vol. 14, No. 5, Jan. 31, 1939, p. 48.

France is the most important purchaser of the American fire-cured tobaccos, with Spain, Belgium, and Germany next in order. The exports of stems, trimmings, and scrap are sent principally to Germany and China, where they are used in the manufacture of cheap tobacco products.

The export situation has been complicated considerably by the fact that governments of many countries have exercised a direct control over the tobacco industry, either by actually operating a government tobacco monopoly, or by the control over import duties. The increasing number of self-sufficiency programs has closed some of the markets to American tobaccos; some countries have encouraged the growth of tobacco in their own colonies and possessions for admittance on a preferential duty. In 1933 it was estimated that one-third of the decrease in American tobacco exports resulted from these trade restrictions.¹

Government tobacco monopolies are found in Austria, Sweden, France, Spain, Poland, Czechoslovakia, Italy, Yugoslavia, Rumania, Turkey, Hungary, and Japan.² In these countries it is comparatively easy for the monopolies to substitute tobacco grown at home for imported tobaccos, regardless of the consumer's preference. In Italy and Japan, American types have been developed, and Japanese "Virginia type" and Italian "Kentucky type" have actually been exported to other countries.

In the United Kingdom a preferential of approximately 50 cents a pound for Empire-grown tobacco has been in effect since 1919 and has been extended to 1942.³ This differential represents one-fourth of the full duty of approximately \$2 a pound. The Empire-grown tobaccos are being accepted by the British consumer and apparently will continue to take an increasing amount of the market away from the American exporter.⁴ The reciprocal trade agreement with Great Britain which was signed in November, 1938, provided, however, that the existing margin of preference extended to Empire-grown tobacco would not be increased.

¹ U. S. Department of Agriculture, Bureau of Agricultural Economics, *World Trade Barriers in Relation to American Agriculture*, Senate Document No. 70, Seventy-third Congress, First Session (Washington, Government Printing Office, 1933), p. 212.

² *Ibid.*, p. 212.

³ Imperial Economic Committee, Report No. 31, *Tobacco* (London, His Majesty's Stationery Office, 1937), p. 2.

⁴ *Ibid.*, p. 22.

Over half the tobacco leaf imports of the United States are destined for consumption in cigarettes. The principal countries from which we secure this leaf are Greece and Turkey, both of which supply the Turkish type of tobacco used in the blending of tobaccos for the popular cigarettes. These two countries usually supply 40% to 45%, by weight, of our tobacco imports.

A larger proportion of imported tobacco is used in cigars than in any other tobacco product. A valuable import, in terms of dollars a pound, is the Sumatra cigar wrapper imported by way of the Netherlands.¹ In poundage, however, this type of tobacco represents less than 2% of total imports. Approximately 25% of the total poundage imported is cigar leaf from Puerto Rico, and Cuba supplies an additional 15% to 20% of total imports in the form of cigar filler. The Philippines are also an important contributor to the manufactured cigar supply, producing in the fiscal year ending June, 1937, a total of 162,844,000 cigars for consumption in the United States. All except an insignificant amount of these cigars were class A, selling for 5 cents each or less, and were principally hand-rolled in Manila factories. In the same period, Puerto Rico produced for consumption in this country less than a third as many as the Philippines produced for the United States. Cuba was formerly an important contributor to the supply of cigars for the American market but has become much less important in recent years, principally because of the competition from low-price, machinery-made, domestic cigars.

APPRAISAL OF PROBLEMS OF THE TOBACCO INDUSTRY

The vast sums spent in advertising tobacco products are an indication of the importance which tobacco company executives attach to this phase of their business. The problem which is constantly in the minds of these men is how to increase the sales of their brands. The problems of purchasing leaf tobacco, of efficient operation of the manufacturing plants, of securing working capital to finance tobacco inventories, and other problems of administration are insignificant in comparison with the problem of sales promotion.

Because of the amounts of money spent on advertising, the manufacturers have been subjected to continuous criticism from

¹ See p. 373.

the tobacco growers, from the government, from consumers, and from economists. The companies, on the other hand, point to the increased consumption of cigarettes, the increased production of flue-cured tobacco, and the new areas of tobacco production which are benefiting from the sale of leaf tobacco.

The question as to whether such a volume of advertising is justified cannot be answered on the basis of known facts, and any attempted answer probably reflects only the bias of the observer. It is true that the consumption of cigarettes has increased enormously, and that these are the tobacco products that have been most extensively advertised. It is also true that the cessation of advertising by the R. J. Reynolds Tobacco Company in 1932 seriously affected its sales volume, and that the volume improved when advertising was resumed. On the other hand, the snuff companies have ploughed along for years, showing steady profits and sales, with little more than billboard and barnyard advertising.

Cigarette manufacturers are not principally concerned with stimulating primary demand for cigarettes, but with creating a selective demand for their own particular brand. The total increased consumption of cigarettes from which all manufacturers may benefit is an indirect result.

Cigarette manufacturers believe that a large amount of advertising is essential. They are mostly concerned, however, with the present situation in which their competitors are looking for every opportunity to launch an aggressive campaign. What would happen if advertising appropriations were reduced or completely eliminated by common consent is a matter of conjecture.

Reduced advertising by one concern would, of course, give others an advantage, but a uniform reduction of sales promotion activities would probably leave all companies in the same relative position. The cigarette advertisers are aiming their campaigns at three major groups: the new smokers, the roll-your-own smokers, and the smokers of brands and other types of tobacco products. The possibility of increasing the total consumption of cigarettes is confined largely to the first two groups, since in the third group effective advertising increases sales of a particular brand but does not necessarily increase the total consumption of cigarettes or of tobacco. Cigarette consumption continues to expand, but large shifts in the preference for any one brand apparently are not caused principally by new smokers but by the

changes in preference of the habitual consumers. In an expanding market, advertising is effective in securing new consumers and in maintaining a company's same proportionate share of the market, but in a stabilized market less advertising by all concerned might be desirable. With an increase in population the market will continue to expand, and because of the nature of the cigarette habit, a new user will probably continue to smoke some brand of cigarettes. It seems unlikely, however, that there will be any increase in cigarette consumption comparable to the expansion that took place when an increasing number of women began to smoke cigarettes.

The secrecy with which the firms in this industry cloak their sales statistics, their advertising plans, and their blends makes it reasonably certain, however, that concerted action or general agreements as to a reduction in advertising will not be attempted. Even if such an agreement were feasible, the manufacturers would be making themselves liable to the charge that they were acting in restraint of trade. It is probable, however, that the prices for tobacco will remain at a general level higher than in the past. Moreover, it is true that the smaller companies seem able to obtain and retain certain small sections of the market for tobacco products. These two conditions may place the larger manufacturers in a position where only a decrease in advertising expenses will enable them to secure a profit margin comparable to that secured in the past.

The relatively small number of manufacturers buying cigarette tobacco makes these buyers perfect targets for farmers' complaints. It is much easier to point a finger at five or six buyers in the tobacco markets than it is to point at the thousands of individuals and firms purchasing cotton. It appears, therefore, that one problem of the tobacco companies is to maintain as friendly relations as possible with the growers and to avoid, for both ethical and practical reasons, any suspicion of price manipulation or collusion in the buying of tobacco. Cooperation with the government in establishing grading standards that are acceptable to the company and understandable to the farmer would be one way of convincing the farmers that the companies and their buyers are interested in paying a fair price for the leaf. Tobacco companies insist that their demands are so exacting and their standards so precise that government inspection and standards of grading are

misleading to the farmer and not useful to the manufacturer. This attitude is undoubtedly sincere, but the problem of convincing the farmer still remains.

Since 1933, prices have been high enough to provide an income sufficiently large to keep the farmer reasonably satisfied. Farmers are now complaining about the activities of the government in restricting the production of tobacco during a period of good prices, but it is certain that the next decline in prices will find them again clamoring for assistance.

Prices may be lower if the export market continues to dwindle. There seems to be little chance for a substantial increase in view of the present restrictions established by many countries on the importation of tobacco. Unless, therefore, domestic consumption increases to compensate for the loss of markets abroad, supplies in the American market will be more than adequate. Consumers' tastes can to some extent be changed so that substitution may be achieved, but some tobaccos will always be in demand for blending, even in the countries which operate government monopolies. Export markets for tobacco will not disappear, therefore, since it is impossible to duplicate exactly the flavor of a particular type of tobacco by planting the same seed elsewhere.

In these days of mounting Federal deficits, the prospects of any reductions being made in taxes on tobacco products are exceedingly dubious. Taxes on cigarettes, in particular, will probably not be changed unless they are increased. The protests of manufacturers, dealers, or growers will be of no avail so long as the government needs revenue badly.

In the meantime the domestic consumer continues to buy cigarettes which he likes at a price which is low in comparison with prices in other countries. In addition, he pays, and pays painlessly, a substantial amount in taxes which otherwise would have to be extracted by more obvious methods.

Regardless of the manufacturers' advertising policies in the future, there is no doubt that their aggressive merchandising efforts have resulted in an increased demand, not only for their products, but for the raw material which the farmer furnishes in the form of tobacco leaf.

CHAPTER VIII

THE WOOL, WOOLEN, AND WORSTED INDUSTRY

The production of wool is one of the oldest of the agricultural industries. The herdsman of antiquity and the shepherd of Biblical times were the predecessors of the sheepherder of today who camps with his flock on the public lands in the Rockies. In this country, the history of sheep raising and of wool manufacturing has been particularly affected by such factors as the opening of public grazing lands, the tariff, the increase in consumption of lamb and mutton, and, more recently, by changes in the demand for woollen goods resulting from style changes and the competition of other textile fabrics.

Much of the wool produced in this country is a joint product and sometimes a by-product of mutton derived from sheep raised for slaughter. Nevertheless, domestic production supplies almost all the needs for wool in this country; only 10% to 15% of the apparel wools has been imported in recent years. Large quantities of low-grade wools, called carpet wools, which do not compete with wool produced in this country, are also imported.

The raising of sheep primarily for wool is a "pioneer" industry and is economical only on the outskirts of civilization where extensive areas of land are available for grazing. Where lambs can be fattened cheaply and sold readily, however, and where the production of wool represents only a part of the income from the flock, sheep can be raised on farms in more densely populated areas such as Ohio. In such cases sheep raising usually constitutes only part of a diversified farming program.

TYPES OF WOOL

Wool is similar to cotton in the variety of classifications into which it is subdivided; it varies in fineness, length, and other qualities between different flocks, between sheep in the same flock, and even within a single fleece. For this reason it is customary to sell wool in individual transactions where buyer and seller or their

direct representatives can discuss grade and quality and where the actual wool to be sold can be inspected.

The characteristics which are most important in wool are the diameter of the wool fiber, or grade, and its length, or staple. Other characteristics include purity, and soundness or strength of the fiber. These characteristics are determined chiefly by the breed of the sheep, their care, and the geographical area in which they are raised. The grade and staple of the wool determine, in part, the use to which it is put.

There are two broad classifications of wool: carpet, which is very coarse and is used for rugs and to make some grades of felt; and noncarpet, frequently called apparel or clothing and combing wool, which is spun to produce woolen and worsted fabrics¹ and yarns for knitting. Practically all the carpet wool consumed in this country is imported. Wool produced in the United States is usually of the finer grades of noncarpet wool.

The grade of the noncarpet wools is measured by two different systems, one of American origin known as the "blood" basis, and the other of British origin known as the "count" basis. The degrees of fineness on the blood basis were originally used to denote the percentage of Merino ancestry in the sheep producing the wool. The seven grades are: (1) fine, (2) $\frac{1}{2}$ blood, (3) $\frac{3}{8}$ blood, (4) $\frac{1}{4}$ blood, (5) low $\frac{1}{4}$ blood, (6) common, and (7) braid. The British system is based on counts, in other words, on the number of 560-yard hanks of yarn required to weigh 1 pound. When the diameter of the yarn is small, a larger number of hanks are required. Thus the wool which can be spun into very fine or small diameter yarn is designated by a higher count. The count grades which correspond respectively to the blood grades are: (1) 80's, 70's, and 64's; (2) 60's and 58's; (3) 56's; (4) 50's and 48's; (5) 46's; (6) 44's; and (7) 40's and 36's. While these terms were originally descriptive, they have come to be used in the market to represent a particular degree of fineness, and are not directly related to either the ancestry of the animal or the precise number of hanks which can be produced.

¹ Woolen fabrics are usually soft and the short fibers project from the fabric since the wool fibers are only carded in an attempt to intermingle them. The worsted fabrics are firm and have little or no nap, since worsted yarns are combed to remove the short fibers and to leave the remaining fibers parallel to the length of the yarn.

THE WOOL, WOOLEN, AND WORSTED INDUSTRY



Wool differs from cotton in that the finest grade usually has the shortest staple, and the coarser grades have the longer staples. Within a particular grade, however, the longer the staple, the more valuable is the wool. There are three staple lengths in each of the five finest grades. There are no subclassifications of grades according to staple lengths for the two other grades, common, or 44's, and braid, or 40's and 36's.

The terms generally used to describe these three lengths in the trade are: staple or combing, which is the longest in each grade; French combing, the medium length; and clothing, which consists of the shortest staples in each grade.

The combing wools are those which can be used to make worsted yarns. Before spinning worsted yarns, the wool must be combed to remove the short fibers and to leave the remaining fibers roughly parallel. The French method permits the use of wool of somewhat shorter staple, since more of the shorter fibers remain after combing. In the manufacture of woollens the wool is only carded rather than carded and then combed. The purpose of the carding process is to intermingle the fibers thoroughly, a process which leaves the wool soft and fluffy for use in overcoatings or blankets, whereas the worsted yarns are rather firm and lustrous, since the combing process removes the short fibers and leaves the remaining fibers parallel. The shorter wools are usually used by the woollen manufacturers, since these wools are relatively cheaper than the longer wools. It is possible for the worsted manufacturers to use the shorter wools, but frequently the excessive weight losses resulting from combing out the shorter fibers make it uneconomical. As a consequence, the worsted manufacturers typically use the longer fibers.¹

Wool is also divided according to the geographical source. United States wool is divided into four classes: Territory, Fleece, Texas, and California. Territory wool is produced in Montana, Wyoming, Colorado, New Mexico, Idaho, Utah, Arizona, Nevada, Washington, and Oregon. Fine wool predominates in the Territory states, since sheep of the Merino type are raised in this area principally for the fine wool they produce, although many lambs are sent to slaughter.

¹ Garside, Alston H., *Wool and the Wool Trade* (New York, Frederick A. Stokes Company, 1939), p. 44.

Fleece wool is grown from the Dakotas eastward, in the following states: North and South Dakota, Minnesota, Iowa, Missouri, Nebraska, Kansas, Wisconsin, Illinois, Kentucky, Tennessee, Michigan, Indiana, Ohio, West Virginia, Virginia, Pennsylvania, and New York. Most of the wool from these states consists of grades lower than fine, or than 80's, 70's, and 64's. Most of the sheep in this area have been crossbred to improve their shape and build for slaughter, rather than to produce a better grade of wool.

Texas wool is usually finer and softer than that of the Territory states, and is preferred for white or light-colored fabrics since it contains very little black hair. Texas wool also has good felting or matting properties, and is used extensively in the manufacture of felt.

An unusually large amount of vegetable matter, such as spiral burs and cockleburs, characterizes the California wool. The amount of vegetable material in the wool is an important factor for the mill buyer to consider, since additional processing is required to eliminate this foreign matter.

Other characteristics of wool include purity, a term used to indicate the absence of hair, kemp, or black fiber, and soundness or strength of the fiber. These characteristics follow the grades, since it is rare that fine wools will have any hair or kemp in them.

Wool is also described as grease wool, scoured wool, and pulled wool. When the wool is shorn it contains a considerable quantity of grease, or oily substance, excreted from the sheep and absorbed by the wool. At this stage it is spoken of as grease wool; it also contains suint, which is excreted from the perspiration glands of the sheep, as well as sand, dirt, and vegetable matter, all of which must be removed before the wool is processed. When the wool is cleaned it is called scoured wool and will weigh from 40% to 60% less than it did as grease wool. Pulled wool is the wool which is removed from the pelts of slaughtered sheep by a depilatory agent or by sweating the pelts. The packinghouses are, of course, the principal source of pulled wool. Shorn wool is that taken from a live animal; dead wool is that taken after slaughter.

PRINCIPAL PRODUCING AREAS

Sheep were brought over by the early settlers of this country, but wool growing was a minor farm occupation until after 1800.

In 1808, however, an embargo was levied on imports of wool and an expanding woollen industry caused an increase in the demand for and the production of wool.¹ Some Merinos had been imported previously, but in 1810 and 1811 the Peninsular wars in Spain resulted in conditions which made Spaniards eager to realize on their investment in sheep. As a consequence, approximately 20,000 Spanish Merinos were imported into this country within a year's time.² These were crossed with domestic sheep, and the production of wool increased.

Most of the wool was produced in the eastern seaboard states, although Vermont was one of the leading wool-producing states. After 1850, as transportation facilities were extended westward and as population increased east of the Alleghenies, the center of wool production moved westward into Ohio and other sections of the Middle West.

In the first half of the nineteenth century, the only sheep in Texas and California were of Mexican origin. Sheep had been brought into Mexico by the Spaniards in the sixteenth century, but the breed had degenerated. As the center of wool production moved westward, descendants of these sheep were bred with Merinos shipped from the eastern wool-growing sections, and the breed and the quality of the wool were improved. By 1880 these two states were important producers of wool.

The Mountain states expanded their production of wool rapidly after 1870. Sheep raising in these states was a major function of the producer, as contrasted with the eastern areas where sheep were raised only as one of the products of the farm.

As the center of sheep population moved westward, eastern production declined. Sheep raising in the East was forced to compete with other farming enterprises which became relatively more profitable because, as the production of wool increased, not only in the western part of this country but in South America and Australia, the price of wool declined. The production of wool in New England declined sharply after 1880; production in other eastern states declined gradually.

By 1900 most of the sheep east of the Rockies, except in Texas, had been crossbred to produce sheep more valuable as meat

¹ Connor, L. G., *A Brief History of the Sheep Industry in the United States*, reprinted from *Annual Report of the American Historical Association*, 1918 (Washington, Government Printing Office, 1920), p. 102.

² *Ibid.*, p. 103.

animals than as producers of wool. The expansion of the meat-packing industry and the development of adequate refrigeration facilities created a wide demand for lamb and mutton. This demand also resulted in a continued increase in the number of sheep in the Mountain states. Packers bought sheep and lambs in this area and shipped them east to Nebraska, Kansas, and Iowa for fattening.¹

EXHIBIT I
WOOL SHORN, BY STATES, 1935-1938
(In thousands of pounds)

State	1935	1936	1937	1938*
Texas.....	59,220	64,265	75,835	79,305
California.....	26,462	26,897	25,962	28,237
Territory states				
Wyoming.....	30,153	29,952	30,361	31,389
Montana.....	32,712	29,351	24,892	25,245
Utah.....	19,125	19,488	19,221	19,909
Idaho.....	18,567	17,600	18,826	17,463
Oregon.....	19,688	17,957	17,501	17,499
New Mexico.....	16,030	15,904	15,394	15,400
Colorado.....	12,216	13,062	13,243	12,862
Other Territory states.....	17,591	16,973	16,747	16,955
Total Territory states.....	166,082	160,287	156,185	156,722
Fleece States				
Ohio.....	19,986	18,800	18,450	17,753
Iowa.....	9,640	9,625	9,600	9,701
South Dakota.....	9,217	10,248	7,947	9,055
Michigan.....	8,508	8,492	8,840	8,031
Missouri.....	8,869	7,989	8,673	8,973
Minnesota.....	7,099	7,200	8,066	7,800
Other Fleece states.....	44,561	42,174	42,534	42,367
Total Fleece states.....	107,880	104,528	104,110	103,680
Other states.....	5,019	4,350	4,517	4,866
Total shorn wool.....	364,663	360,327	366,609	372,810
Total pulled wool.....	66,000	66,200	66,200	63,700
Total United States wool.....	430,663	426,527	432,809	436,510

* Preliminary.

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data, 1938* (Washington, May, 1939), p. 87.

The number of sheep in the United States has declined from the peak reached in the years near the turn of the century. The amount of public land available for sheep ranges decreased, and the price of land increased with more intensive agricultural development. The raising of sheep primarily for wool in the

¹ *Ibid.*, pp. 150-151.

general farming regions of the Middle West declined, and more attention was paid to sheep suitable for the production of lambs for slaughter. Despite this decrease in numbers, the production of wool has increased because of the increase in the average weight of the fleece.

The Territory states along with Texas and California produce two-thirds of the wool shorn in the United States (see Exhibit 1). In these areas sheep raising is a large-scale enterprise, as shown by the data in Exhibit 2. In value of wool produced and in size of flock, such states as Wyoming and Nevada are in sharp contrast with states such as Ohio and Iowa. In the Fleece states, where the flocks are smaller, the returns from lambs exceed the returns from wool.

EXHIBIT 2
STATISTICS ON WOOL PRODUCTION, SELECTED STATES, 1934

State	Average amount of wool pro- duced per farm (in pounds)	Average value of wool produced per farm	Average size of flock shorn (number of sheep)	Average weight of wool per sheep and lamb shorn (in pounds)
Texas.....	2,199	\$ 484	306	7.2
Wyoming.....	8,699	1,914	903	9.6
California.....	2,533	481	352	7.2
Montana.....	4,753	1,094	498	9.5
Utah.....	3,643	729	424	8.6
Idaho.....	2,115	486	242	8.7
Oregon.....	1,942	408	216	9.0
New Mexico.....	2,525	454	358	7.1
Colorado.....	2,743	549	345	7.9
Ohio.....	290	72	34	8.5
Iowa.....	199	42	24	8.2
Nevada.....	8,802	1,848	1,153	7.6

Source: Based on figures of U. S. Bureau of the Census, *Census of Agriculture: 1935*, (Washington, Government Printing Office, 1937), Vol. III, pp. 274, 278.

PRODUCTION OF WOOL

Except in Texas and California, wool is sheared each spring sometime between March and June, depending on the geographical location of the ranch and the climate. In Texas and California from 15% to 25% of the sheep are clipped twice a year, in the spring and fall. The fall shearing depends principally on the price of wool, and hence is an irregular practice. Some ranchers believe,

however, that fall shearing keeps the sheep in better condition in the warmer climate. There is no advantage in shearing sheep twice a year as far as production of wool is concerned, since the average clip for the entire year is approximately the same whether the sheep are sheared once or twice during the period.

The majority of sheep are now sheared by a machine with which one man can shear from 100 to 150 sheep per day. Shearing requires a skillful operator since the wool may be damaged or the sheep injured in the process. Some sheepmen insist that machine shearing is more likely to hurt the sheep, particularly by taking off too much wool and leaving the sheep too bare to endure sharp changes of weather after shearing. The weight of a fleece from a single sheep averages approximately 8 pounds, but is somewhat higher in those states concentrating on the production of wool, such as Wyoming and Montana.

After shearing, the fleece is rolled and tied, preferably with paper twine. Sisal twine is used by many producers, however, and these fibers cling to the fleece and become mixed with the wool. The vegetable or sisal twine fibers do not take the wool dye, and show up as defects in the cloth. Paper twine is much more desirable, therefore, for if any of this twine remains in the wool it is dissolved in the scouring process.

After the tying, the fleeces are packed in bags, each of which weighs from 250 to 400 pounds and averages approximately 300 pounds. Little grading is done in the shearing sheds, although some producers remove the stained britch and tags.¹ On the whole, fleeces are not sheared or packed so carefully in America as they are in Australia, although shearing and packing methods have been improved in recent years.

The sheep raisers are financed by local agencies, by the wool dealers, and by agencies of the Farm Credit Administration. Expenses are heaviest in the winter, when feed must frequently be purchased and additional labor and supplies provided. Banks frequently lend to large sheep producers, taking a lien on the sheep as collateral. The wool merchant also makes advances to producers during some winters to assure himself of a supply, and occasionally the merchant buys the wool on the sheep's back. The usual advance averages 50 cents per head, although on a higher market advances are larger. The merchant receives a

¹ The tags are the large dungy locks removed from the sheep's buttocks.

chattel mortgage on the wool and sometimes, when advances are larger, on the sheep. These advances are repaid when the wool is sheared and shipped. Usually the loans and advances from the other agencies are also cleared in the spring after the sheep are sheared and the spring lamb crop has been sold.

MARKETING OF WOOL

When the wool is scoured or washed to remove the grease and other foreign matter, the resulting loss in weight is known as shrinkage. Shrinkage is one of the most important items which the wool buyer must consider when purchasing wool, since he must estimate how much scoured wool can be secured from the grease wool. A miscalculation in the estimated shrinkage will frequently mean the difference between a profit and a loss on the transaction. This, then, is another important reason why the buyer inspects individual lots before setting a price.

Because the scale of operations varies in each of the producing areas, the methods of marketing the clip also vary. Four channels for selling wool are usually available to producers in the Territory states, and in Texas and California: (1) local sale—to one of several traveling representatives of different wool merchants, to a local buyer, or, if one is near-by, to a local woolen mill; (2) consignment to a wool merchant to be sold under specified conditions; (3) sale through a local pool; or (4) consignment of the clip to a cooperative association. In Texas, furthermore, the wool may be put in a warehouse for sale. Some wool merchants have resident agents who buy on commission under the supervision of a traveling representative covering a wider territory; others send representatives to the producing areas. The local buyers include small dealers who buy wool for speculation, or for sale within a few days to a wool merchant or mill buyer. The local wool buyer is much less important in the Territory states than in the Fleece states. In some areas, such as California and Oregon, local woolen mills can be utilized as a market outlet for the producer's clip. If the clip is sufficiently large to justify it, several buyers may be invited to the ranch to inspect the wool and submit sealed bids. In Texas, the warehouse system is an important marketing outlet for the wool clip. These warehouses are usually owned by groups of producers; they function both as storage places for the wool and as supply houses for materials required by the producers.

Warehouses may act as selling agents, and frequently they make loans to wool growers. The Texas wool clip is more uniform than that in other states, and direct sales to both mills and wool dealers, who buy substantial amounts from these warehouses, is thus facilitated.

There has been some agitation to establish auction markets for wool similar to those utilized in Australia to handle the clip. Auctions have been held for several years by one firm in Ogden, Utah, which solicits the business of the growers and makes advances to them. So far, however, no wool auctions have been established in the East.

Since 1930, cooperatives have handled a large proportion of the total clip, varying from 33.5% in 1930 to 13.8% in 1933 and 21.3% in 1934.¹ In 1934 over two-thirds of the amount of wool marketed by cooperatives was produced in Texas, California, and the Territory states. The simplest type of cooperative is the wool pool, which provides a means of assembling the clips of several growers at one point where the wool can be sold to the highest bidder. This type is more common in states such as Utah, where a large proportion of the wool produced is similar in grade and character. The wool is usually sold without grading. Some pools sell the clip of each producer separately after sealed bids have been submitted.

The pool is quite distinct from the organized cooperative marketing association located at a more central point, which grades the wool and sells it directly to mills or to wool merchants. Many of the cooperatives now own stock in and are members of the National Wool Marketing Corporation of Boston, a national cooperative which is the sales agency for these cooperatives. Sixteen of the 20 cooperatives operating in the Territory states sold their wool in 1935 through the National Wool Marketing Corporation.² Much of the Territory wool handled by this corporation is sold in the original bags to the mill buyers in Boston.

Another method of sale through the corporation which was formerly used, the so-called "unit-marketing plan," was a type

¹ U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 6, *Statistics of Farmers' Cooperative Business Organizations* (Washington, May, 1936), p. 87.

² U. S. Farm Credit Administration, Cooperative Division, Bulletin No. 3, *Cooperative Marketing of Agricultural Products* (Washington, February, 1936), p. 93.

of pool operation designed to give a particular producer the average price received for his grade of wool during the season. Under this plan producers' clips were separated into lines according to the grade of wool; values were then established for each producer's consignment after a few sales had been made. The proportion of the value of the individual producer's wool in relation to the total value of all the clips received was determined, the grower notified of the appraised value of his wool, and sometimes another advance was made, in addition to the first advance when the wool was consigned. At the end of the season, or when all the wool in this pool was sold, the producer received his proportionate share of the total proceeds. As in any pool plan, the producer received a benefit when the market rose during the selling season, but when the market declined he took his proportionate loss along with the rest of the producers participating in the pool. In 1938, the unit-marketing plan under that name was discontinued by the National Wool Marketing Corporation. Under the new plan producers' clips were separated into grading lines, but the corporation made a point of the fact that in each grade three lines were made up to provide for varying shrinkage values, and each producer's final returns were computed on the basis of the precise grade and shrinkage of his wool after all the wool in the various grades had been sold.¹

Wool is shipped on consignment principally to the wool merchants in Boston. The merchant sells the wool for a commission, either at the best price he can get, or if so instructed, at the price which the producer states is satisfactory. Since the producers market a larger clip per farm in the Territory states, in California, and in Texas, most of the consigned wool originates in these states.

Since flocks are smaller in the Fleece states, the local dealer is more important than in the Territory states in collecting the wool from near-by producers, either for his own account or on instructions from a wool merchant. Most of the fleece wool is handled by local dealers, and few advances are made before shearing and sale. There is a greater variety of grades in each clip in the Fleece states than in the Territory states.

¹ It seems clear that the National Wool Marketing Corporation was faced with the dilemma of attempting to preserve, at least in form, the cooperative pool idea, and still compete with wool dealers and their established method of handling the producers' clips.

The cooperatives in the Fleece states operate on a different basis from that of the cooperatives in the Territory states. Local grading points have been established where each farmer's clip is graded separately. Frequently the farmer does not receive an advance until after the wool is graded and classified. Samples are then sent to Boston to the National Wool Marketing Corporation, which displays them for prospective buyers. The wool is shipped on order direct to the buyer from the local cooperative. The National Wool Marketing Corporation keeps each pool of the Fleece cooperatives separate, and the accounting is made direct to the cooperative, which, in turn, settles directly with its members.¹

Boston is today the outstanding wool market of the country and is second only to London in world importance. Philadelphia is the next most important market in this country, and considerable wool is sold in St. Louis and Chicago. In the early days Boston became important because it was the largest city adjacent to the wool-producing regions, including Vermont, and also to the mills located along the streams of New England. The development of the worsted industry in Massachusetts and its rapid growth also encouraged the development of Boston as a wool market. Proximity to the mills was important because the sale of wool was accomplished by individual transactions. Because each bag or lot of wool is different, mill buyers must inspect each lot to see whether it will meet the mill's specific requirements. Hundreds of individual transactions make up the wool market in Boston, although there is no organized trading center. Because of the private nature of the transaction and the lack of either observers or rules of procedure, wool selling is akin to Yankee trading, and the wool trade is one of the last strongholds of the stalwart Yankee individualist.

The wool merchant or dealer, who should not be confused with the local dealer located in the sheep-producing areas in the Middle West and West, is an important functionary in the marketing of wool. His function is somewhat comparable to that of one of the larger cotton shippers. The wool dealer may finance the production of wool, arrange for its transportation to the East, grade it, store it, and finally, find a buyer for it. Some dealers also have affiliated organizations which scour wool, and some

¹ U. S. Farm Credit Administration, Bulletin No. 3, p. 95.

which manufacture wool tops, or semimanufactured wool which has been cleaned and combed and is ready for spinning into worsted yarn. Most wool dealers have relatively small organizations; buying from the producer and selling to the mills is frequently on the basis of a personal acquaintance and contact which is maintained over a period of years.

Instead of selling wool in the western producing areas to a wool dealer, it has been pointed out that the producer may consign his wool to one of the same dealers. From 1920 to 1935 an average of 36.2% of the wool production of the United States was marketed on consignment. The percentage varied widely from year to year, amounting to 76.9% in 1920 and to only 12.7% in 1928. In the years from 1930 to 1932 the average was approximately 50%, and it fluctuated from 34.3% in 1933 to 63.9% in 1934 and declined to 24.2% in 1935.¹

The dealer is usually selling his own wool at the same time he is selling the wool which has been consigned to him to dispose of for a commission. In the latter instance the producer retains the title to this wool. Criticism has been directed at dealers who have acted in this dual capacity, particularly when some consigned wool remained unsold in 1934 and 1935 and large quantities were held in the dealers' warehouses until the following season. The many protests at that time were contributing factors in causing a Senate investigation of this practice. Hearings were held in May and June, 1938, to investigate this and other phases of wool marketing.²

Much of the criticism of the wool merchants arises from the peculiarities of wool itself. Wool is purchased by the mill buyer on his estimate of the return after scouring; in other words, he buys the grease wool on a shrinkage basis. This estimate of shrinkage is not relayed to the consignor. It has been alleged, therefore, that various lots of wool of high and low shrinkage have been sold as one lot so that all owners received the same grease rates for their poundage. It has also been charged that when lots were mixed, producers did not receive the price which their particular grade of wool justified. In the sale of wool, however, the dealer himself may not know what estimate of

¹ U. S. Senate *Hearings before the Special Committee to Investigate the Production, Transportation, and Marketing of Wool*, Seventy-fifth Congress, Third Session (Washington, Government Printing Office, 1938), pp. 13-14.

² *Ibid.*

shrinkage the mill buyer is using, since the buyer may not inform him for fear of losing some bargaining power. Furthermore, the dealer is using his best judgment when he mixes lots, believing that they will bring a better price when mixed, sorted, and graded with similar wools than when sold separately. If he attempted to allocate the price received proportionately to the consignor on the basis of sharp distinctions of grading, that would also be a matter of judgment subject to criticism.

Another criticism was based on the allegation that the farmers were not allowed to determine how their wool would be marketed, but that the dealers dictated both the prices and the method and terms of sale. It was argued that the dealers could forecast the movements of the market more intelligently than the producers. In years when prices were expected to be firm, therefore, the dealers would contract for the wool in advance of shearing and thus anticipate the competition which would be keen at shearing time. When it appeared that the market would be weak, it was charged that the dealers by refusing to purchase wool forced the producers to consign their wool.¹ With the organization of the National Wool Marketing Corporation in 1930, some of these criticisms were overcome, since the grower then had an alternative outlet through the cooperative. There were still some complaints, however, particularly as prices declined.

Of course it is a common practice, particularly in depressed times, to find a scapegoat upon which complete blame for all difficulties can be placed. The functionaries in the market are blamed for the variations in price when it seems reasonably clear that in most cases the middlemen's actions merely reflect the general business situation and the result of demand in relation to available supplies. It is much simpler, however, to cry "Thief" than it is to track down the culprit by scientific methods. Similarly, it is far easier for the farmer to believe, either by his own experience or through the influence of someone who profits by posing as the farmers' friend, that scoundrels are responsible for low prices, than it is for him to study and understand the complicated price structure, supply and demand elements, and general business conditions.

¹ U. S. Federal Trade Commission, *Cooperative Marketing*, Senate Document No. 95, Seventieth Congress, First Session (Washington, Government Printing Office, 1928), pp. 154-155.

The practice of acting both as consignee and as owner of the same type of commodity is not peculiar to the wool trade.¹ In the marketing of livestock and fruits and vegetables, it is customary for a dealer to act in both capacities, and he is permitted to do so under the regulations of the Packers and Stockyards Act and the Perishable Agricultural Commodities Act. In both cases, however, the consignee must inform the consignor in case the commodities are sold to any business in which the consignee has an interest.

The arguments in favor of the combined function in the wool trade run along the following lines: Mill buyers know the grade and quality of wool they want and will examine all the dealer's stock within the general grades in which the buyer is interested. The buyer, of course, may select either consigned wool or dealer-owned wool. After selection, when the mill buyer and the dealer discuss price, the dealer is anxious to secure a good price, whether he owns the wool or not, since selling consigned wools at a low price would deter the sale of his own stock at what he considers to be a fair price. Furthermore, the dealer is eager to sell the consigned wool at as high a price as possible in order to retain the goodwill of the consignee, for the dealer depends upon handling the producer's clip in following years, whether by actual purchase or consignment.

The wool dealer, in order to maintain a volume of business sufficient to pay overhead and the traveling expenses of his buyers, must supply the needs of his mill customers and he must be able to secure wool from the producers. In other words, the mill buyers will not visit him unless he has available the distinctive grades which each mill specifies. At the same time the dealer's service and function in collecting wool, grading it, storing it, and making it available for sale depends on satisfactory relations with the producers. The actual title to the wool is not important in the merchandising functions which he performs, although obviously such title is important in terms of the capital invested. If the importance of efficient merchandising and distributing is subordinated to the dealer's pecuniary interest, he is to be censured and punished for his lack of ethical principles, and in the long run he will suffer from loss of patronage. The individual transactions

¹ Of course in no commodity is it customary for the middleman to act as consignee and purchaser in the same transaction.

in the purchase and particularly the sale of wool make the wool dealer a target for criticism. On the other hand, this type of transaction, depending as it does upon personal acquaintance and business associations which extend over a period of years, is itself alleged to be one of the best protections for the grower in insuring fair and just handling of his property.

Obviously, a dealer who does not treat his consignees fairly should be restricted in his operations. Whether restrictions should be imposed by the dealers themselves or by the Federal government is a problem raised by the recent senatorial investigation. Unless the dealers themselves are able to control the small minority who may engage in malpractices, all are likely to suffer from broad restrictions regardless of the records of individual firms. There is no doubt that these criticisms and complaints have been overemphasized and that many are unjustified. The Senate hearings were adjourned temporarily when Congress adjourned, before all the dealers had had a chance to refute the charges made by the government investigators. Certainly no judgment should be made, or legislation passed, until the full story of both sides has been heard.

NEW YORK WOOL TOP FUTURES EXCHANGE

Wool tops consist of the semimanufactured wool which is spun into worsted yarn. The grease wool is scoured or cleansed in a solution and the wool is then carded and combed until the long fibers are roughly parallel and the short fibers, or noils, are removed. The loose untwisted strand which is produced is known as a wool top.

A futures market for wool tops was established by the Wool Associates of the New York Cotton Exchange in 1931. The unit of trading is 5,000 pounds, and contracts are traded in for all months in the year but not more than eleven months in advance of delivery. Delivery formerly could be made in Boston or, after freight allowance from Boston, at any one of 28 other points in Massachusetts, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, and Rhode Island. Since June 1, 1938, however, deliveries are permitted only in and from bonded warehouses in Boston.¹

¹ Garside, *op. cit.*, p. 119.

The majority of the firms engaged in topmaking do not own combing plants, but have the wool combed on commission. The real function of the topmaker is to select the wools to be used and to blend them in the right proportion to produce the proper quality of top at low cost. There were, in 1938, more than 20 topmaking firms.¹ Two or three of these firms owned combing plants and the remainder had the wool combed on commission. In addition to this group, there were approximately 80 spinners of worsted yarn that made tops for their own use or on commission for the topmakers. Only six of these were strictly commission combers, but most of the others accepted commission business when their own operations permitted it.

There are probably 150 to 175 potential buyers of wool tops. Included in this number are the 80 spinners mentioned above, 12 to 15 spinners who have no combing equipment, and approximately 70 yarn dealers or agents who buy tops and have them spun on commission.²

Volume of trading on the New York Wool Top Market increased from a monthly average of 1,000,000 pounds in 1936 to 3,000,000 pounds in 1937, and membership increased from 17 to 35. In 1938, the number of members rose to 65 and the monthly average expanded to over 5,000,000 pounds.³ Apparently much of the increase resulted from the fact that commercial banks required mills, wool top manufacturers, and yarn dealers to hedge inventories when loans were made. Prices broke drastically in the latter part of 1937, at which time wool manufacturers and dealers protested that the trading units and margin requirements were inadequate and that trading should be suspended until the wool top futures market could be placed under the supervision of the Commodity Exchange Administration.⁴ It was charged that the "fictitious market value" for wool tops resulted in unusually low prices for raw wool. Trading was not suspended, but in April, 1938, the market was put under the jurisdiction of the Commodity Exchange Administration by an amendment⁵ to the Commodities Exchange Act.

¹ *Ibid.*, p. 73.

² *Ibid.*, p. 77.

³ National Association of Wool Manufacturers, *Bulletin* (Boston, 1938), Vol. 47 p. 163.

⁴ *The New York Times*, Nov. 26, 1937, p. 36.

⁵ Public No. 471, Seventy-fifth Congress, Third Session.

A wool top futures market is also located in Antwerp and another in the adjoining towns of Roubaix and Tourcoing in France. Both markets were opened in 1888, closed during the World War, and not revived for active trading until 1929. Futures markets for South American types of grease wool were established in the 1880's at Havre and Antwerp, but trading was never active and was later discontinued.¹ The personal methods of selling raw wool which have arisen out of the necessity for individual inspection effectively prevent satisfactory trading in raw wool futures when deliveries on contracts would have to be made on the basis of official description rather than personal examination. For this reason, wool tops were used as the commodity to be traded in, even though tops are a semimanufactured article. Wool tops can be bought and sold by description because the important qualities which will determine the type of yarn to be spun can be effectively standardized.

It is understandable, however, that there should be objections to a wool top futures market on the part of growers, dealers, and manufacturers. Since wool tops are the result of the first stages of processing, and reflect in part the judgment of some manufacturer who has graded, sorted, scoured, and combed raw wool, the grower might well think that such actions change the qualities of raw wool and, therefore, should have no bearing and relationship to the price of raw wool. Similarly the dealer, accustomed to individual sales, is perturbed when a buyer reports that the futures market for wool tops is lower, and he therefore bids less for the dealer's stock. The manufacturer sees another element entering the market picture which is likely to affect his buying practices and his profits.

These objections are to be expected in the introduction of any new futures market, and are accentuated by the peculiar characteristics of wool and the wool trade. As a consequence, education is likely to be slow, and widespread use of the market delayed. There is some doubt that the market will achieve necessary depth resulting from a large volume of trading, because of these difficulties. Certainly wool dealers will be slow in approaching the 100% hedged position of the cotton merchant until methods of sale are changed. Growers are always wary of metropolitan

¹ DuPlessis, A. F., *The Marketing of Wool* (London, Sir Isaac Pitman & Sons, 1931), pp. 267-269.

futures markets for agricultural commodities. Finally, there is no reason to believe that manufacturers will make extensive use of the market, when cotton manufacturers have not yet adopted the principle of hedging all transactions in a broader and well-established cotton futures market.

WOOLEN AND WORSTED INDUSTRY IN THE UNITED STATES

The woollen industry was begun in the United States much earlier than the cotton industry. The wool industry of the seventeenth and eighteenth centuries was local in character, however, and was principally a supplement to home manufacture. After 1808 the industry began to expand, and mechanical power-driven equipment was invented abroad and introduced here to increase production. As in the case of the cotton industry, so the woollen industry and the worsted industry, which developed later, have encountered difficulties in recent years. Unlike the cotton industry, however, the woollen and worsted industry has had no substantial outlet for its products other than clothing and household goods; the industrial use of woollen and worsted goods, which includes principally automobile upholstery, is far less important than the industrial uses of cotton.

In the colonies, each household produced most of the woollen goods consumed by the family. Fulling mills were established as early as 1643 to perform the finishing operations on the goods woven in the home.¹ In these fulling mills the cloth was treated with soap and water to clean and shrink the product, and, either by pressure or beating, the cloth was smoothed to even out the intermeshed yarns. Sometimes the fulling mills also sheared and dyed the cloth.

England, where a better supply of wool and a more expert group of weavers could be secured, was the principal source of high-grade woolens during this period. After the Embargo Act of 1808, which restricted imports of woolens from England, the number of domestic woollen factories increased. Some of the mechanical equipment already developed for use in the cotton-textile industry was adapted for use in woollen manufacture. Factories were small but were assuming increasing importance. It has been estimated that by 1830 the factory production of

¹ Cole, Arthur H., *The American Wool Manufacture* (Cambridge, Harvard University Press), Vol. I, pp. 10-11.

woolens accounted for approximately a third of the domestic demand for woolen cloth.¹

By 1870 home production of wool had declined substantially and factories were supplying almost all the needs of the nation. The factories producing woolens moved westward with the population and during this period were considerably more dispersed than the cotton mills, which were concentrated in New England. The worsted section of the industry developed at a much later date and was confined principally to Massachusetts.

Worsted manufacture increased rapidly after 1900; it had been developing steadily since 1870 during the period in which the woolen industry was declining. The reason for this change was the displacement of woolen goods by worsteds for use as clothing. Worsted yarn is much more even and is stronger than woolen yarn, and in addition the elimination of the short fibers makes the woven fabric smoother and the weave much more noticeable. Worsted cloths are also lighter in weight and therefore preferable for use in clothing. The woolen weaving industry also suffered by the increasing competition from the knit goods which were being substituted for flannels and other woolen woven goods.

After 1909 the trend was reversed, the production of worsteds declining and the production of woolens increasing. The popularity of tweeds, homespuns, and other woolen fabrics resulted in a decline in the demand for worsteds, although this branch of the industry continued to be dominant. The automobile industry began to use some woolens for upholstery after 1920, when the trend towards closed cars became evident.

The woolen and worsted mills enjoyed the boom period during the World War as much as the cotton-textile industry did, and plant facilities were expanded to take care of the increased demand. After 1920 the industry suffered from excessive capacity and from declining and variable demand. Increased competition from silk, particularly in women's dress goods, contracted the market for woolens and worsteds. Another aspect of demand which created a serious problem for the woolen and worsted manufacturers was the increasing emphasis on style. A corollary of this style consciousness was the shortening of the style cycle. To mills accustomed to turning out miles of staple and standardized cloth, the problem of developing new and attractive styles

¹ *Ibid.*, p. 261.

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each year and then each season, and of producing only the quantities that could be sold, was new and serious. Many plants lost heavily through inventory depreciation.

EXHIBIT 3 THE WOOLEN AND WORSTED INDUSTRY, 1937

Item	Woolen woven goods	Woolen yarns	Worsted woven goods	Worsted yarns	Related industries group*
Number of establishments.....	332	41	176	71	704
Average number of wage earners.....	61,931	2,749	70,227	17,303	159,277
Total wages paid....	\$ 62,597,710	\$ 2,777,402	\$ 71,100,699	\$14,847,002	\$159,080,495
Value of products...	\$288,748,200	\$13,558,498	\$408,841,825	\$89,740,804	\$826,801,799
Value added by manufacture.....	\$115,693,931	\$ 4,964,539	\$131,936,938	\$23,438,062	\$290,781,161

* Includes wool combing, wool scouring, woolen and worsted dyeing and finishing industries in addition to the four industries for which detailed figures are given.

Source: U. S. Bureau of the Census, *Biennial Census of Manufactures: 1937*, Press Release, Dec. 30, 1938.

The data in Exhibit 3 show that the worsted branch of the industry is still slightly larger than the woolen branch both in

EXHIBIT 4 VOLUME OF PRODUCTION AND VALUE OF SALES OF WOVEN GOODS, WOOLEN AND WORSTED INDUSTRY, 1935 (By type of goods)

Kind of woven goods	Production (in thousands of square yards)	Sales to customers (in thousands of dollars)
Men's wear fabrics:		
All-wool woolens—woven.....	88,287	\$ 76,324
All-wool worsteds—woven.....	143,878	137,724
Mixed fabrics.....	85,833	42,785
Total men's wear.....	317,998	\$256,833
Women's wear fabrics:		
All-wool woolens—woven.....	71,516	52,563
All-wool worsteds—woven.....	34,509	27,082
Mixed fabrics.....	52,860	30,550
Total women's wear.....	158,885	\$110,195
Nonapparel fabrics*.....	61,736	60,487
Blankets, blanketing, and robes.....	60,875	24,346
Woven felts.....		12,180
Total woolen and worsted woven goods...	599,494	\$464,041

* Auto cloths, upholstery, and drapery fabrics, billiard and other cloths.

NOTE: These data for 1937 not available in preliminary reports.

Source: U. S. Bureau of the Census, *Biennial Census of Manufactures: 1935* (Washington, Government Printing Office, 1938), pp. 411-415.

terms of laborers employed and in value of products manufactured. The dominance of the worsted branch has declined since its peak in 1909. In addition to the reasons mentioned earlier, an important factor in explaining this decline is illustrated by Exhibit 4 in the amount of fabrics now woven for clothing from a mixture of wool and other fibers such as silk, rayon, and cotton. Fundamentally, this combination of materials is another aspect of the style problem and the tendency towards lighter weight clothing material. Exhibit 4 also indicates that approximately 80% of the total output of the woolen and worsted industry is used for clothing and only a small proportion for other purposes. From this division it is clear that changes in style and in consumers' taste for clothing are of more importance to the woolen and worsted industry than to the cotton-textile industry.

Although the major proportion of yarns produced from wool are destined for use in manufacturing woven goods, some yarns are produced for use in the knit-goods industry and some for hand knitting. The types of yarn produced in 1937 are shown in Exhibit 5.

EXHIBIT 5
PRODUCTION OF WOOLEN AND WORSTED YARNS, 1937

	Pounds produced		
	For own use	For others on com- mission	For sale
Spun on woolen system:			
Weaving yarns (excl. carpet).....	255,068,970	4,148,909	5,337,462
Machine knitting yarns.....	12,883,125	1,528,978	5,410,410
Hand knitting yarns.....			
Spun on Bradford system:*			
Weaving yarns (excl. carpet).....	73,058,066	2,821,225	24,278,266
Machine knitting yarns.....		1,043,422	22,222,922
Hand knitting yarns.....		†	5,231,526
Spun on French system:			
Weaving yarns (excl. carpet).....	23,244,567	1,369,163	4,777,545
Machine knitting yarns.....	†	"	8,060,423
Hand knitting yarns.....	†	"	374,011
Total yarns.....	364,254,728	10,911,697	75,692,565

* In woolen and worsted industries only.

† Included with made "For Sale" to avoid identity of individual establishments.

Source: U. S. Bureau of the Census, *Biennial Census of Manufactures: 1937*, Press Release, Apr. 11, 1939, p. 5.

PROCESSING OF WOOL

As previously indicated, the processes of manufacture differ in the production of woollen and worsted yarns, and the differences in weaving and in the appearance of the finished cloth result from this earlier difference in processing. In the manufacture of woollen yarns, the principal object is to treat the individual fibers in such a way that they are thoroughly intermingled, with little attention paid to the length of the fibers or their relation to one another. The result is a soft yarn which is suitable for heavy fabrics or fabrics where the "nap," the short fibers protruding from the woven goods, is a desirable constituent. In the manufacture of worsted yarns, these short fibers are removed by combing, and, more important, the remaining long fibers are made approximately parallel. Consequently, the worsted yarn can be drawn out to a thinner diameter, and a slight twist is given to it in spinning to add strength and to make the yarn smoother. The differences in the manufacturing process mean not only that different equipment is used, but that the specifications for the raw wool are different. For these reasons the processing of wool in these two branches of the industry will be discussed separately.

In the manufacture of woolens, as in the case of worsteds, the wool must be sorted. Sometimes this is done roughly at the shearing sheds by putting the fleece along with others of a comparable grade. The wool merchant opens the bags and puts the fleeces in piles of similar grades unless there is sufficient likeness to the bags of wool in a given lot to enable him to sell it in the bag to a wool processor without previous sorting. Frequently, however, it is necessary to grade the fleeces, and sometimes even to separate and sort the various grades in a single fleece. Typically, the wool processor sorts the wool at the mill just before the scouring process. The sorting is a much more skillful process than grading, and it is in this advanced step of separating fleeces that the manufacturer can demonstrate his care in the preparation of his product. In general, the higher the quality of the wool, the more carefully and precisely the wool is sorted.

Grease wool contains a large percentage of dirt, vegetable matter, sheep's sweat, and wool grease which must be removed before the wool is processed further. The wool is first loosened and then cleaned of dust and some vegetable matter either by

mechanical action or by air suction. Scouring consists of soaking the grease wool in a solution of soap, water, and some chemical such as potash. The wool is moved through a series of bowls and in each of them it is stirred mechanically and then squeezed through rollers to remove the solution. The wool is then dried by hot air. If all the vegetable matter has not been removed, the wool is carbonized by being placed in a mixture of sulphuric acid and water, and then dried. The acid dissolves the vegetable matter but does not harm the wool fibers.

The next process consists of dyeing the wool, if it is to be dyed before spinning, and mixing it with rayon, shoddy or reclaimed wool, or cotton, if these fibers are to be used in the yarn. The wool is then carded, the purpose of this operation being to mix the wool fibers as thoroughly as possible. The effect of bulkiness is desirable for woolens, and consequently no attempt is made to remove the short fibers.

The yarn is then spun by a combined drafting and twisting action as the roving is fed to the spindle. The carriage on which the spindles are placed moves away from the delivery rolls through which the roving passes at about the same speed as that at which the roving is fed to the spindles. The yarn is drawn out to approximately twice its original length and a slight twist is imparted as the yarn slips over the spindle. The yarn is then wound on the spindles as the carriage returns to its original position near the delivery roll. In recent years, continuous spinning frames have been introduced which dispense with the backward and forward motions of the carriage, and the spindle operates continuously as the draft is effected by drawing rolls. An increasing number of mills are being equipped with this type of frame because of its speed of operation and the saving in floor space it makes possible.

The weaving process for wool and cotton is similar except that, in the case of wool, weaving is much more important in determining the design or pattern of the finished product. The weft, or filling yarn, may be of one or more colors of wool yarn, or it may be cotton or rayon. The weave of the fabric is determined by the spacing of the warp, or lengthwise threads, as the shuttle passes through.

The first of the finishing operations to improve the appearance and texture of the fabric is fulling. The fabric is soaked in soapy

water to shrink the material and is then passed through rollers to squeeze out the water and to press the yarn closer together to give the loosely woven material a firmer texture. After this process the soap is removed by scouring the wool in clean water. Other finishing operations include carbonization to remove any remaining vegetable matter; napping and shearing to give the fabric an even nap or pile; brushing; pressing; burling, which is the inspection and marking of defects; and mending.

For worsted yarns the scouring and carding processes are similar to those for woollen yarns. The combing operation is an additional process performed to eliminate the short fibers and to leave the long fibers approximately parallel. The long fibers which come from the combing machine as a continuous strand are called tops, and the short fibers, or noils, are sold for use in manufacture of the woollen yarns.

In the manufacture of worsted yarns two general methods are employed: the Bradford system, and the French or Continental system. The principal difference is in the method of drawing the bulky strand of tops into strands of smaller diameter, and in the amount of twist imparted during this process. In the Bradford system oiled tops are used principally. Olive oil is applied to the tops in the combing operation so as to reduce the "fly," or the number of fibers which come out of the yarn in the spinning operation. In spinning, the top slivers are put through a number of drawing operations to produce the roving from which the yarn is spun. The drawing operation involves passing the tops through rollers operating at successively increasing speeds in order to reduce the diameter of the strands. Considerable twist is imparted to the strand during this operation. The rovings are then fed to the spindles, which revolve at a high rate of speed, and the yarn is further drawn out and twisted as it is wound on the spindle.

Only dry combed tops are used in the French system of spinning worsted yarn. The first operation in this system is drafting, an elongation of the yarn with a corresponding reduction in its diameter. No twist is imparted to the yarn in this process. The yarn is spun on mules, which first perform an additional drafting operation. The yarn is then spun and only twist is imparted to it in this operation. This system produces yarn which is softer, but which does not have the strength of the yarn spun by the Bradford system. French combs are frequently used to produce the tops for

spinning on the French system. This method of combing leaves a large proportion of short fibers in the top, and as a consequence the wool to be used need not have so long a staple as wool to be spun on the Bradford system.¹

The weaving of worsted yarns does not vary materially from the weaving of woolen yarns. The worsted yarn, however, is strong, so that the speed of the looms can be higher for worsted than for wool. Designs, patterns, and weaves are probably more important in the weaving of worsted fabrics, since the cloth has little nap but has a hard finish so that the weave is usually more obvious than it is in woolen goods.

Although wool is by far the most important raw material used in the woolen and worsted industry, other fibers are used in substantial quantities. The wool and hair manufacturing industry, as defined by the Bureau of the Census, consumed in 1935 a total of 221 million pounds of scoured wool, 25 million pounds of mohair,² 12.5 million pounds of cotton, and 12.7 million pounds of rayon.³ In addition, 80 million pounds of all-wool worsted yarns were consumed.

MARKETING OF WOOLEN AND WORSTED FABRICS

Woolen and worsted manufacturers usually finish the fabrics in their own mills. The designs and styles also are originated and manufactured in the mill, although the mills using selling agents receive suggestions and, sometimes, designs from their agents. There is no functionary in this industry comparable to the converter in the cotton-textile industry. The manufacturers of woolens and worsteds are directly concerned with changes in style and in consumers' tastes, and with the conditions in the wholesale market. A large proportion of these manufacturers sell direct to the garment manufacturers and other customers of the mill. In 1931, 66% of the woolen and worsted mills in the country sold

¹ For a more detailed and technical treatment of the woolen and worsted manufacturing processes see Von Bergen, W., and Mauersberger, H. R., *American Wool Handbook* (New York, American Wool Handbook Company, 1938).

² Mohair is clipped from goats in a manner similar to that used in the clipping of sheep. The average clip per goat is 4.2 pounds per year. Goats are clipped once a year in all states except in southwest Texas, where many are clipped twice a year. In 1935 a total of 3,737,000 goats were clipped in the United States, of which 2,820,000 were in Texas.

³ U. S. Bureau of the Census, *Biennial Census of Manufactures: 1935*, p. 417.

direct through special departments or branches of the mill, 29% sold through agents, and 5% used both methods of sale.¹

The selling agent in this industry performs the same functions, in varying degrees, as does the selling agent in the cotton-textile industry. These functions include: (1) consultation and sometimes direct specification as to types of fabric, designs, and styles to be produced; (2) the actual selling of the cloth, either through salesrooms in New York or through salesmen visiting clothing manufacturers and cutters-up; and (3) the collection of accounts

EXHIBIT 6
SALES OF MEN'S AND WOMEN'S WEAR FABRICS, BY TYPES OF CUSTOMERS, 1924

Fabric	% to cutters-up	% to wholesalers and jobbers*	% to retailers	% to export trade
Men's wear fabrics:†				
All-wool woolen.....	93	6	†	.....
All-wool worsted.....	85	13	2	†
Wool-and-cotton-mixed.....	55	37	8	.....
Cotton-warp woolen.....	96	3	1	.....
Cotton-warp worsted.....	98	2	.....	†
Total men's wear.....	91	8	1	†
Women's wear fabrics:§				
All-wool woolen.....	86	10	4	a year
All-wool worsted.....	44	45	10	arment
Wool-and-cotton-mixed.....	.....	.....	.....	samples,
Cotton-warp woolen.....	73	16	11	s to be sold
Cotton-warp worsted.....	4	91	2	er. ¹ Approxi-
Total women's wear.....	46	47	.....	ge the raw wool

* Estimated that from 50 % to 60 % resold by wholesalers and

† Suitings and overcoatings.

‡ Less than 1 %.

§ Suitings, dress goods, coatings, and cloakings.

Source: Harvard Business School, Bureau of Business Research, *Textiles*, pp. 56-57.

receivable and the advance of funds to down to the retailers. difference between sales representatives' minds. As a consequence, industry and those in the cotton-textile minds. As a consequence, proportion of the woolen and worsted practice in this industry. financial interests in the mills' course, when prices drop, and textile sales representatives' adjustments are frequently made

¹ Cherington, Paul T., *The Wool Industry* (Washington, The Wool Sample, mills were buying wool in large quantities

² Cox, Reavis, *The Wool Industry*, which the garment manufacturers and retailers Inc., 1938), p. 184 volume in the late spring and summer of 1939.

The customers buying wool fabrics from the mill include the cutters-up, wholesalers and jobbers, and retailers. The cutters-up, or garment manufacturers, are the most important, since the large majority of wool fabrics are sold to the ultimate consumer as finished garments, rather than as piece goods. The proportions of men's wear and women's wear fabrics sold to various customers in 1924 are shown in Exhibit 6.

A later survey¹ indicated that these figures had not changed materially by 1931, except that there had been some increase in sales direct to retailers of men's wear all-wool woolen fabrics, and some increase in sales to wholesalers and jobbers of women's wear all-wool worsted fabrics.

The data in Exhibit 4 demonstrated that approximately 80% of the woolen and worsted woven goods produced in this country was used for clothing, and over 50% of the total production was used for men's and boys' clothing. The cutters-up of men's and boys' clothing are, therefore, a vital part of the distribution mechanism in the wool industry. Although the design and appearance of the wool fabric itself change comparatively little, the producers of woolens and worsteds watch closely changes in processes of manufacturing garments, in style trends, and in manufacturers' merchandising policies. In 1935, there were 2,981 establishments which manufactured men's, youths', and boys' clothing valued at \$546,000,000.² Two-thirds of these establishments were classified as regular factories manufacturing ready-to-ship from fabrics in their own stock, while one-third were making up suits to order for their customers. There is no inventory of goods in the latter type of factory. The woolen and worsted fabrics are supplied by the customers. While the manufacturers of woolens and worsteds from fibers other than wool are included,³ the woolen and worsted clothing represents approximately 90% of the market. A large part of the clothing is manufactured by the industry. The proportion of the garment manufactured by the industry. The proportion of the garment manufactured by the industry. The proportion of the garment manufactured by the industry. In 1931, 66% of the woolen and worsted outerwear for women, misses, and boys was manufactured by the industry. The proportion of the garment manufactured by the industry. In 1931, 66% of the woolen and worsted outerwear for women, misses, and boys was manufactured by the industry.

¹ For a more detailed and technical analysis of the manufacturing processes see Von Bergen, W., *Woolen and Worsted Handbook* (New York, American Wool Manufacturers Association, 1935), p. 363.

² Mohair is clipped from goats in a manner similar to that of sheep. The average clip per goat is 4.2 pounds. References as to the types of a year in all states except in southwest Texas, where the average clip per goat is 4.2 pounds. In 1935 a total of 3,737,000 goats were clipped in the United States, 2,820,000 were in Texas.

³ U. S. Bureau of the Census, *Biennial Census of Manufactures: 1935*, p. 363.

clothing and fabrics they wear. Sales are made to these consumers through department stores, independent and chain clothing stores, and mail-order houses. By the time the clothing has reached the consumer, the identity of the manufacturer of the fabric is lost, although he is responsible for the pattern, weave, durability, and general attractiveness of the goods. The consumers' choices are relayed through the retail outlets to the garment manufacturer and thence to the manufacturer of the fabric. Generally, of course, the consumer and the retailer are unable to designate precise choices, but merely register their own convictions by saying they will or will not buy a certain fabric already manufactured.

The dangers of this distance between the consumer and the wool manufacturer, and the number of intermediaries through which information must be passed, are apparent. The increasing emphasis on style accentuates this problem, particularly when the style cycle is short. While it is true that men's clothing is not subject to such rapid and radical style changes as women's clothing, style and variety of pattern have received increasing emphasis in recent years, and staple items such as the blue serge for Sundays have become less important.

The style cycle has affected the actual operations of the mills, and the producing units have been coordinated to the selling methods. The mills are usually preparing for seasons a year ahead when samples are made up to be shown to the garment manufacturers. Sales are made on the basis of these samples, and the mills begin to produce in the late fall the goods to be sold as suits or dresses the following spring or summer.¹ Approximately eight weeks is normally required to change the raw wool to a finished fabric. Additional time is required for the garment manufacturers to make up the suits or dresses and then to send salesmen on the road with samples to be shown to the retailers.

During this period of time, conditions may change and the purchasers of fabrics may change their minds. As a consequence, cancellation of orders is a common practice in this industry. These cancellations increase, of course, when prices drop, and if the order is not cancelled adjustments are frequently made

¹ In December, 1938, for example, mills were buying wool in large quantities to be made up into gabardine, which the garment manufacturers and retailers expected to sell in large volume in the late spring and summer of 1939.

on the undelivered balance. Because of the competition in the industry, concerted action has never been successful in correcting these abuses, which create difficult operating problems for the mills and frequently result in financial loss. This practice is likely to continue, however, until some mill or group of mills with much courage and adequate cash reserves takes a firm stand to eradicate it.

WOOL CARPET AND RUG INDUSTRY

The wool used in the manufacture of wool carpets and rugs is imported. Carpet wool is coarse and the fibers are long. This type of wool is obtained from a poor breed of sheep and is produced at a very low cost. As a result, no wool is raised in this country specifically for the carpet industry, although some off-sorts and low-grade wools are used. Consequently, the carpet and rug industry is not of great importance from the standpoint of wool production in the United States. In terms of size, however, the industry is important, since this industry consumes one-third as much wool as does the woolen and worsted industry.

The majority of carpet and rug manufacturing establishments are located in Pennsylvania; New York and Massachusetts are the two next most important states. In 1937 the industry produced more than 65,000,000 square yards of wool carpeting, and rugs valued at \$150,000,000.

Since carpet yarn does not need to be so smooth as woolen and worsted yarns, the face of the rug or carpet is usually made of coarse wool of long staple. The backing of the rug is generally jute or cotton yarn, inasmuch as these fibers are stiffer and serve to hold the "pile," or face of the rug, in place. The weaving process is distinctive, its purpose being to insert the wool yarn vertically in order that it may be cut and then sheared to make the pile.

CONSUMPTION OF WOOL

The total consumption of wool has increased in the United States during the last fifty years, but the per capita consumption and the percentage of wool in relation to the total consumption of all textiles have declined. From 1880 to 1900 the per capita consumption of wool averaged over 6 pounds, and from 1900 to 1925 the average was usually over 5 pounds. The data in Exhibit

7 show that the per capita consumption of wool has averaged only approximately 4.4 pounds during the past five years.

A decrease in imports has coincided with the decrease in the consumption of wool. The relation of tariff schedules to the volume of imports will be discussed later; suffice it to say here that over the last twenty years increasing proportions of the clothing and combing wool used in the mills in this country have been produced domestically, although this trend has been reversed in 1936 and 1937. As previously pointed out, carpet wool is usually imported.

EXHIBIT 7
CONSUMPTION OF WOOL, 1918-1938

Year	Imports of clothing and combing wool,* less re-exports (in thousands of pounds)	Mill consumption of clothing and combing wool*			Per capita consumption of apparel wool, greasy shorn basis† (pounds)	Imports of carpet wool,* less re-exports (in thousands of pounds)
		Scoured basis (in thousands of pounds)	Greasy shorn basis (in thousands of pounds)	Domestic wool in percentage of total consumption		
1918	377,682	371,200	676,000	..	6.5	69,292
1919	336,774	283,100	563,700	..	5.4	96,873
1920	207,419	264,300	510,900	51.3	4.8	35,093
1921	217,233	299,700	597,400	63.6	5.5	97,820
1922	189,486	312,800	640,400	72.3	5.8	172,828
1923	243,270	311,300	603,100	51.7	5.4	121,518
1924	94,495	249,700	518,000	69.2	4.6	140,684
1925	171,980	251,700	525,200	69.5	4.6	157,579
1926	170,142	254,700	524,100	66.0	4.5	115,235
1927	109,850	258,700	551,100	75.7	4.7	143,871
1928	87,132	232,400	511,900	82.9	4.3	148,794
1929	100,352	253,200	554,700	80.2	4.6	174,483
1930	70,135	200,700	447,900	81.2	3.6	90,621
1931	42,915	237,700	545,200	89.6	4.4	113,795
1932	13,522	188,500	439,800	95.0	3.5	39,195
1933	59,341	245,500	572,200	94.0	4.5	114,468
1934	29,258	167,600	381,400	90.4	3.0	79,084
1935	41,984	303,982	713,347	94.8	5.6	158,477
1936	110,712	278,258	618,478	83.6	4.8	143,276
1937	150,160	248,121	524,363	72.7	4.0	172,091
1938§	30,811	219,565	514,410	91.8	.....	71,908

* From U. S. Department of Agriculture, Bureau of Agricultural Economics, *Livestock, Meats, and Wool Market Statistics and Related Data*, 1938, p. 87.

† From Bulletin of the National Association of Wool Manufacturers, *Statistics of the Industry* (Boston, 1938), Vol. 47, p. 182.

‡ Not compiled by grade.

§ Preliminary

The decrease in per capita consumption may be attributed partly to the lighter-weight clothing worn by men, and partly to the increasing competition, first from silk, and then from rayon and rayon-and-cotton mixtures, in women's dress goods. The changes in style and the rapidity with which fashions spread, the development of central heating plants, and the relatively high prices for wool fabrics as compared with those for other fabrics have all had a part in changing consumers' demands for clothing. The sales volume of woolen and worsted fabrics for automobile upholstery has not risen fast enough to change the trend of total consumption of wool. Blankets and robes also provide for only a small proportion of the total consumption of wool.

Men's suits account for the largest proportion of the consumption of woven fabrics used in apparel. Of the total of 469,461,000 square yards of apparel fabrics used in the manufacture of clothing and garments in 1937, 215,634,000 square yards, or 46%, were suitings and pantings.¹ A total of 45,578,000 square yards, or about 10%, was used in the manufacture of topcoats and overcoats.

The majority of men's suits are made wholly or partly of wool. In 1937 a representative group of manufacturers producing approximately 90% of the total men's, youths', and boys' clothes in the country reported that of the 18,000,000 suits of men's and youths' clothing cut in 1937, more than 16,000,000, or 91%, were either all-wool or part-wool. Of the remainder, 6% were made of mohair, silk, or linen, and 3% were made of cotton.²

The largest proportion of woolen and worsted women's wear fabric is used in the production of women's coats. Of the total production of women's wear coatings, suitings, and dress fabrics, amounting to 144,127,000 square yards in 1937, 64%, or 88,449,000 square yards, consisted of fabrics for coats.³ In terms of value of women's, misses', and juniors' outerwear produced by the cutters-up, wool fabrics are obviously far less important than in the case of men's clothing. Furthermore, although the principal item of women's outerwear consists of dresses, which accounted for 65% of the total value of women's wear, dresses manufactured from wool fabrics represented only about 5% of the total value of all

¹ U. S. Bureau of the Census, *Biennial Census of Manufactures: 1937*, Press Release, Apr. 11, 1939, p. 3.

² Bulletin of the National Association of Wool Manufacturers, *Statistics of the Industry* (Boston, 1938), Vol. 47, p. 247.

³ U. S. Bureau of the Census, *Biennial Census of Manufactures: 1937*, Press Release, Apr. 11, 1939, p. 3.

dresses manufactured. In numbers, wool fabric dresses probably represented a smaller proportion, since this type of dress usually sells at a higher price than the cotton, rayon, or even silk dress. On the other hand, women's suits, ensembles, separate coats, and separate skirts are made principally from wool fabrics.

TARIFF ON WOOL

The tariff on imports of wool and wool fabrics was first imposed in 1816, and has been the center of many struggles, criticisms, and complaints ever since. The tariff has been applied continuously, except from 1894 to 1897 and from 1913 to 1921, and at the present time the rates are higher than they have been during any previous period.

The tariff was first applied to assist the domestic wool industry when English woolens flooded the country following the repeal of the Embargo Act of 1808¹ and after the War of 1812. The ad valorem rates were 15% on wool and 25% on woolens. Later tariff acts in 1824, 1828, and 1832 raised the rates, although the acts of 1846 and 1857 reduced them. The Tariff Act of 1861 introduced a new feature, compensatory duties on wool manufactures. These duties were designed to compensate the domestic manufacturer who used foreign wool for the higher cost of the wool used in competition with imported fabrics; in addition, an ad valorem duty was applied to protect the industry.

The wool growers and wool manufacturers joined together at an early date to present a united front to legislative bodies. In 1865, the newly formed National Association of Wool Manufacturers met with representatives of the various state associations of wool growers to discuss the tariff on wool and to make recommendations to the United States Revenue Commission.² As a result of this meeting, recommendations were made to the revenue commission that the tariffs on wool and woollen cloth be raised.³ In 1867, the wool tariff was raised, and the principle of compensa-

¹ Cole, *op. cit.*, Vol. II, p. 6.

² *Report of the Proceedings of the Convention of Delegates from the National Association of Wool Manufacturers and from the Several Organizations of the Wool-Growers of the United States at Syracuse, New York, December 13, 1865* (Boston, John Wilson & Sons, 1866), p. 6.

³ *Joint Report of the Executive Committee of the National Association of Wool Manufacturers and of the Executive Committee of the National Wool-Growers' Association*, addressed to the United States Revenue Commission, Feb. 9, 1866 (Boston, John Wilson & Sons, 1866), p. 22.

tory duties was applied in greater detail. The compensatory duties were calculated on the basis that 4 pounds of wool were required to make a pound of finished cloth. Since wastage in the manufacturing process is not appreciable, this ratio meant that calculations were based on a 75% shrinkage of the grease wool. This allowance was considerably higher than the average shrinkage of domestic wools, and probably represented the maximum shrinkage, rather than the average, of the foreign wools toward which the duty was directed, inasmuch as imported woolen fabrics were made exclusively from foreign wools.¹ Thus the wool manufacturer was provided additional protection through this calculation of the compensatory duties.

No substantial change in the wool tariffs took place until 1894, when wool was placed on the free list. Ad valorem rates on manufactured wool were kept, although the compensatory rate was removed. The rates were restored in 1897, and rates on imported wool manufactures were increased.

Under the Wilson administration in 1913 wool was again placed on the free list. During the World War, however, prices were high, mills were active, and growers were happy. After the war, when prices declined drastically in 1920, both the growers and the manufacturers suffered. An emergency tariff act was passed in 1921, with rates higher than ever before. These emergency rates were maintained in the Tariff Act of 1922. In this act rates were set at 31 cents a scoured pound; it was the first time the duty was levied on this basis rather than on wool in the grease. The concealed protection of the compensatory duties was also removed; the ratio used was 1½ pounds of scoured wool to 1 pound of fabric. This concealed protection had been of greatest advantage to the worsted branch of the industry, which had grown from a few small mills to the largest division of the industry during the sixty years that the former ratio had been used in the tariff schedules. The worsted manufacturers use wool which has a lower shrinkage than the wool used in the manufacture of woolens. Thus, the domestic worsted manufacturers derived greater benefit from this protection in competition not only with foreign goods but also with the domestic woolen goods.

The Tariff Act of 1930 again raised the duty on raw wool, and the compensatory and protective rates on wool fabrics and

¹ Cole, *op. cit.*, p. 9.

yarns were raised proportionately. With minor exceptions, these rates are still in effect. This act set the duty on scoured wool at 34 cents a pound. The rate on wool tops was set at 37 cents a pound for a compensatory duty,¹ and 20% ad valorem. The compensatory rate on yarns was 40 cents a pound and 35% to 50% ad valorem, depending on the value per pound.² For woven fabrics the compensatory rate was 50 cents a pound, and from 50% to 60% ad valorem.³ This increase in the tariff on scoured wool in conjunction with the world-wide depressed business conditions resulted in an almost complete stoppage of imports. The tariff alone was not to blame, however, since imports have increased substantially in the last two years.

The importance of the tariff to the consumer, the grower, and to the manufacturer has occupied the attention of many businessmen, statesmen, and scholars. From the consumers' point of view it appears clear that some burden is imposed by the tariff on wool. The price in the United States does not vary from the world price by the full amount of the duty, but it has been estimated that the American consumer pays in normal times approximately 80% of the tariff on wool.⁴ The proponents of the wool duty are the growers and the economic nationalists. The growers are important politically for the same reason that the sugar-beet producers are important; the producing regions have a large representation in the Senate because of the number of states interested in sheep raising, and although the representation is proportionately lower in the House, the group is still important. Protection of the growers alone does not, however, seem to be an adequate reason for the maintenance of the duty on wool. The producers, particularly in the Fleece states, now derive a large proportion of their income from the sale of lambs and sheep for slaughter. Sheep raising is incidental to other farming operations for many of the producers, and reduction or elimination of the duty would not affect their total income materially. The sheep-raising industry would not be wiped out if the duties were removed,

¹ Schedule 11, Paragraph 1106. To make 1 pound of tops requires $1\frac{1}{10}$ pounds of scoured wool; hence 1.1 multiplied by the rate of 34 cents for scoured wool equals 37 cents.

² *Ibid.*, Paragraph 1107.

³ *Ibid.*, Paragraphs 1108 and 1109.

⁴ Mohat, Haldor R., *The Tariff on Wool* (Madison, Tariff Research Committee, 1935), p. 126.

and the reduced cost to the consumer should result in some increase in consumption.¹

The compensatory duty on manufactured wool products is, of course, to be considered in the same category as the duty on raw wool. The protective ad valorem tariff is designed to protect the domestic wool manufacturers who apparently depend upon the tariff to a far greater degree than do the wool growers. Withdrawal of the protective tariff on wool manufactures would cause considerable hardship in the industry.² There seems to be little possibility that these duties will be eliminated or revised to any great extent.

The reciprocal trade agreement signed with the United Kingdom in November, 1938, did, however, reduce the duties on some woolen fabrics. The compensatory duties were not changed, but the ad valorem percentage was reduced on certain of the finer and more expensive fabrics weighing more than 4 ounces per square yard. The reductions averaged 25%. Undoubtedly these changes will create additional competition for domestic manufacturers, although in the official statements the point was emphasized that changes were made only on fabrics and articles which were British specialties and which were not produced in this country.

OTHER ACTIVITIES OF THE FEDERAL GOVERNMENT AFFECTING WOOL

There was no crop reduction program for wool such as the Agricultural Adjustment Administration carried out for other commodities. Government activities in wool were concerned principally with loans to growers and with the marketing of consigned wool. A program was inaugurated by the Farm Credit Administration in 1933 to market the wool which had been pledged as collateral for loans either from the regional agricultural credit corporations or indirectly through the Federal Intermediate Credit Banks.³ Under this plan the wool was to be sold by approved consignees as the market permitted. The operation of the plan was under the supervision of the Wool and Mohair Advi-

¹ Taussig, F. W., *Some Aspects of the Tariff Question*, 3d edition (Cambridge, Harvard University Press, 1931), pp. 316-321; and Smith, Mark A., *The Tariff on Wool* (New York, The Macmillan Company, 1926), pp. 293-294.

² Taussig, *op. cit.*, pp. 474-490.

³ U. S. Farm Credit Administration, *First Annual Report, 1933* (Washington, Government Printing Office, 1934), p. 43.

sory Committee, appointed by the Governor of the Farm Credit Administration. This committee consisted of representatives of the growers, dealers, cooperatives, and others in the wool trade, and the financing institutions. All the wool of the 1933 and 1934 clips financed or held as collateral for loans from government agencies was to be consigned to one of the approved consignees. In addition, the "free" wool handled by these consignees was also under the supervision of the committee. This free wool included wool purchased outright by the consignees and wool not under mortgage to the government agencies which was consigned to these firms.¹ In 1935, growers were permitted to sell their wool to local buyers if they so desired.

The consignees were required to sell the so-called government wool "equitably" and "ratably." "Equitably" meant that "the consignees should use the same effort to sell this wool and to obtain the best price possible as they did in selling other wool handled by the consignees."² "Ratably" was interpreted to mean that, "in so far as it is practicable (weekly) sales reports shall include a percentage of government-financed wools not less than the percentage of government-financed wools taken, to the total amount of wool taken by the consignee."

A total of 289,100,000 pounds, which represented 77% of the total production of the United States, was handled under this plan in 1933. Of this amount, 78,600,000 pounds was wool financed by the agencies of the Farm Credit Administration, and 210,500,000 pounds was free wool.³ Fifty-five million pounds of the government wool had been sold by December 31, 1933.⁴

In 1934 a total of 227,100,000 pounds, or 61% of the total clip, was handled under the plan. Of this amount a little more than a third was government wool and the remainder was free wool.⁵ The wool moved slowly, and only 49,000,000 pounds of all the wool under the plan had been sold by the end of the year.⁶ In other words, the unusually large amount of 178,100,000 pounds

¹ U. S. Senate *Hearings before the Special Committee to Investigate the Production, Transportation, and Marketing of Wool*, pp. 324-327.

² Wool and Mohair Advisory Committee, *Regulation No. 6*, June 3, 1933.

³ U. S. Senate Special Committee Hearings, *op. cit.*, p. 326.

⁴ U. S. Farm Credit Administration, *First Annual Report*, 1933, p. 43.

⁵ U. S. Senate Special Committee Hearings, *op. cit.*, p. 326.

⁶ U. S. Farm Credit Administration, *Second Annual Report*, 1934 (Washington, Government Printing Office, 1935), p. 74.

of wool remained unsold. This condition resulted from the poor market for wool during that year, when manufacturers, who had accumulated heavy stocks from the 1933 clip, bought very little during the marketing season of the 1934 clip. The Wool and Mohair Advisory Committee also was reluctant to approve successively lower prices for wool, despite the unfavorable demand situation. Stocks were large at the beginning of the 1935 season, amounting to 403,813,000 pounds on a grease basis, the largest proportion of which was held by dealers.¹

The plan was continued in 1935, which proved to be a better year for wool. A total of 193,922,000 pounds was handled under the plan, 28,987,000 of which were financed by the Farm Credit Administration,² and sales amounted to 168,607,000 pounds, of which 23,329,000 were financed by the Farm Credit Administration.³ The wool from previous clips also moved; 24,464,000 pounds of 1933 wool and 176,580,000 pounds of 1934 wool were sold at that time. As of December 31, 1935, the consignees held as unsold a total of 25,315,000 pounds of the 1935 clip, 2,868,000 pounds of the 1934 clip, and 178,000 pounds of the 1933 clip.⁴ The Wool and Mohair Advisory Committee recommended that the plan be discontinued as far as any new clips were concerned, and it was announced in December, 1935, that the committee would continue to supervise the unsold wool, but that there would be no plan for the 1936 clip.

The slow movement of the 1934 wool resulted in many complaints that the consignees were not selling the consigned wool ratably. These complaints were contributory to the pressure on the industry which resulted in the appointment of the Senate committee authorized in 1935 to investigate practices in the wool trade. The first hearings before this committee were held in May and June, 1938, and the committee then adjourned. Because of the lack of further appropriations, no further meetings had been held by July, 1939.

¹ U. S. Bureau of the Census, *Quarterly Wool Stock Report*, Mar. 30, 1935.

² This was not the total amount of wool financed by the Farm Credit Administration in 1935. A total of 43,800,000 pounds was sold by the growers to local buyers in the West, because under the 1935 regulations they were permitted to do this if they chose to, rather than send it to the approved consignees. U. S. Senate Special Committee Hearings, *op. cit.*, p. 326.

³ U. S. Farm Credit Administration, *Third Annual Report, 1935* (Washington, Government Printing Office, 1936), p. 115.

⁴ *Ibid.*, p. 116.

No activities by the government were evident after 1935 until 1938, when the Commodity Credit Corporation announced that \$50,000,000 was available for loans on wool stored in warehouses or on consignment.¹ Loans were to be made on a maximum of 250,000,000 pounds, grease basis, at 15 cents to 22 cents a pound, depending on the grade. When the loan program expired December 31, 1938, a total of \$14,916,065 had been loaned on 82,587,824 pounds of wool (grease basis).² By February 11, repayments of \$7,209,679 covering 40,068,600 pounds of wool (grease basis) had been made. In March, 1939, announcement was made that a similar loan program would be in effect for the 1939 clip.³

PRINCIPAL COMPANIES IN THE INDUSTRY

Massachusetts is the most important producer of woolens and worsteds and is the center of the wool trade. Rhode Island, New York, New Jersey, and Pennsylvania are important producers of worsteds, and Maine, New Hampshire, Vermont, and Connecticut are important producers of woolens. The worsted industry is more concentrated in the New England and Middle Atlantic states than is the woolen industry. Many small woolen mills are scattered throughout the country.

The largest company in the industry is the *American Woolen Company*. In 1937, the net sales of this company amounted to \$75,061,505, roughly 12% of the total sales of the industry. Most of the company's mills are located in New England, its largest one being the Wood Mill at Lawrence, Massachusetts. The largest proportion of the company's output is men's wear fabrics.

Pacific Mills, another large company, also produces woolens and worsteds, although the company is more important in the production of cotton textiles. This company produces men's wear fabrics and automobile upholstery. Other companies operating several mills include *Arlington Mills*, *Cleveland Worsted Mills Company*, the *Botany Worsted Mills*, the *Stillwater Worsted Mills*, and *M. T. Stevens Sons & Company*. The *Goodall Worsted Company* manufactures Palm Beach cloth, a mixture of wool, mohair, and cotton. This company is notable because it owns

¹ U. S. Department of Agriculture, Press Release 1410-38, Mar. 12, 1938.

² *The Wall Street Journal*, Feb. 15, 1939, p. 3.

³ *The New York Times*, Mar. 26, 1939, Section VI, p. 4.

cutting establishments, and not only designs and styles its cloth but manufactures its own men's suits.

Other specialty manufacturers of importance include *Sidney Blumenthal & Company, Inc.*, producers of velvets and plushes; *Collins and Aikman Corporation*, producers of women's wear woolens, velvets, and plushes; and the *Forstmann Woolen Company*, manufacturers of women's wear. The largest carpet and rug manufacturer is the *Bigelow-Sanford Carpet Company, Inc.* *The Mohawk Carpet Mills, Inc.*, is the second largest company in this branch of the industry.

The principal trade association of the industry is the National Association of Wool Manufacturers, which was founded in 1864. The association includes all types of wool manufacturers, top-makers, and sales agencies. The association formulates standards and rules for the trade, collects various statistics, and acts in behalf of the industry in legislative matters concerning the tariff, wages and hours of operation, and other types of regulation of the industry. The association was responsible for the establishment in 1935 of the Associated Wool Industries, a cooperative effort on the part of manufacturers, dealers, and growers to promote new and more extensive uses for wool. This association also assisted department stores in planning merchandising campaigns for the sale of wool products, and attempted to secure favorable publicity for wool and wool products through various media.

INTERNATIONAL TRADE IN WOOL

Since wool is usually produced in large quantities in the sparsely populated regions of the world, and since the manufacturers are usually located near the centers of population, there is a large volume of international trade in wool. The principal producing and exporting countries are Australia, Argentina, Union of South Africa, New Zealand, Uruguay, China, and British India. The principal importing countries, all of which produce at least some wool in their own country, are France, the United Kingdom, Germany, United States, Belgium, Italy, and Japan. Data on imports and exports of these countries are shown in Exhibit 8.

In this country, a large volume of wool is imported annually without duty to be manufactured into rugs and carpets. In

EXHIBIT 8
INTERNATIONAL TRADE IN WOOL: AVERAGE FOR 1925-1929; ANNUAL
FOR 1934-1936
(In thousands of pounds)

Country	1925-1929 Average		1934		1935		1936*	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Exporting:								
Australia.....	739,123	3,990	677,210	6,357	919,076	5,401	796,514	9,370
Argentina.....	294,973	302	244,777	113	300,842	85	307,762	108
Union of South Africa.....	254,431	576	196,284	1,319	270,420	3,050	220,285	2,665
New Zealand.....	220,228	103	255,797	24	222,656	155	314,408	119
Uruguay.....	117,856	0	57,966	0	111,080	0	101,432	0
China.....	58,272	568	35,322	1,852	50,327	1,457	41,359	1,185
British India.....	50,373	27,843	40,504	16,729	49,885	22,757	46,479	27,330
Importing:								
France.....	53,286	633,028	48,467	438,955	49,821	502,267	69,223	465,510
United Kingdom..	54,037	473,061	54,827	541,150	56,143	595,267	46,560	662,465
Germany.....	24,109	361,447	10,409	332,690	3,619	287,163	945	247,093
United States.....	322	288,346	119	109,401	20	202,733	16	257,725
Belgium.....	19,091	135,887	99,658	164,836	117,155	235,327	247,458	106,214
Italy.....	7,188	99,134	5,033	147,204	884	115,985	1,117	42,312
Japan.....	0	93,489	0	182,847	0	245,245	0	219,584

* Preliminary.

Source: U. S. Department of Agriculture, *Agricultural Statistics, 1937* (Washington, Government Printing Office, 1937), Table 389, p. 286, and *ibid.*, 1938, Table 452, p. 327.

EXHIBIT 9
IMPORTS FOR CONSUMPTION OF UNMANUFACTURED WOOL AND HAIR
1920-1937
(In thousands of pounds, actual weight)

Year	Carpet wool*	Clothing wool	Combing wool†	Mohair, alpaca, etc.	Total
1920	38,274	212,453	4,178	4,436	259,341
1925	142,278	20,564	142,521	2,337	307,700
1930	78,312	17,003	58,652	1,952	155,919
1931	123,937	5,554	29,902	359	159,752
1932	44,637	4,100	9,132	229	58,098
1933	119,934	5,274	25,777	1,082	152,067
1934	85,181	4,681	18,475	1,058	109,395
1935	171,504	4,329	24,628	2,270	202,731
1936	169,229	8,599	76,160	3,736	257,725
1937	195,651	11,700	114,901	3,778	326,030

* Including camel's hair and apparel wool not finer than 40's.

† Excluding camel's hair, mohair, alpaca, etc.

Source: Bulletin of the National Association of Wool Manufacturers, *Statistics of the Industry* (Boston, 1938), Vol. 47, p. 137.

recent years carpet wool has represented more than half the total imports of wool, as may be seen from the data in Exhibit 9.

The principal sources of wool imported into the United States are shown in Exhibit 10. The clothing and combing wools come principally from Australia, Argentina, Uruguay, and New Zealand. Carpet wools are imported principally from China and British India.

EXHIBIT 10
WOOL* IMPORTED INTO THE UNITED STATES FOR CONSUMPTION, BY
PRINCIPAL COUNTRIES, 1934-1937
(In millions of pounds, actual weight)

Country	1934	1935	1936	1937
Australia.....	7.7	10.0	32.8	70.1
Argentina.....	24.9	50.4	60.4	69.2
New Zealand.....	4.4	10.9	21.5	34.2
China.....	29.7	47.7	27.6	28.8
British India.....	14.3	26.6	22.6	26.3
Uruguay.....	4.5	5.2	22.9	22.3
United Kingdom.....	6.7	25.8	25.4	17.8
South Africa.....	0.8	1.0	5.2	5.8
All other countries.....	16.4	25.1	39.3	51.5
Total.....	109.4	202.7	257.7	326.0

* Includes mohair, alpaca, etc.
Source: Bulletin of the National Association of Wool Manufacturers, *op. cit.*, p. 138.

APPRAISAL OF PROBLEMS OF THE INDUSTRY

The principal problem facing the producers, the dealers, and the manufacturers of wool is the declining consumers' preference for woollen fabrics. For many years the woollen and worsted manufacturers adhered to the philosophy that production was more important than sales, that whatever was produced, regardless of volume, could be sold. This emphasis on supply and the neglect of the demand aspect have resulted in overcapacity of productive equipment; the relatively high price of wool fabrics and some lack of imagination in designing have resulted in the loss of part of the market to other fibers and fabrics. Undoubtedly before sound progress and recovery are possible, the industry will find it necessary to investigate thoroughly the relation of demand to the products manufactured by the industry, the marketing structure which has been established, and the possi-

bility of producing new and attractive fabrics which are not too expensive. All the problems of the industry relate to this aspect in one way or another.

The satisfactory understanding of this problem and the establishment of mill organization and procedure to cope with it effectively are of prime importance to the growers, since the return from their product is almost entirely dependent upon American industry and American consumers. The growers of this country have already concentrated on the production of fine wool and are receiving a high price per pound for their product. There are several ways, however, whereby the position of intelligent growers can be improved. One of these is the improvement in preparing the clip for market. There is general agreement that the American wool is the worst-packed clip in the world. Manufacturers are particularly irate over the continued use of sisal twine to tie fleeces, and some refuse to buy wool tied with this twine; the sisal fibers become entangled in the wool and cause processing difficulties. Careless handling of the fleeces, the excess number of tags which stain the good wool, improper packing in the bags, and lack of proper care in the shearing sheds reduce the value of the wool. These difficulties can be eliminated, but such a program requires the cooperation of dealers as well as of growers. Growers will continue to be careless unless emphatically urged by the buyers to improve their methods and unless higher prices are paid for carefully packed wool.

The growers have another problem which, unless solved satisfactorily, may react unfavorably upon them. This problem involves relations with the dealers. There have been many complaints concerning the dealers, some of which may be justified. In the long run, however, a sweeping reorganization of the marketing channels of wool is likely to result in lower prices to the producers because of the increased costs of marketing, not all of which can be passed on to the consumer. Furthermore, if the pressure of the growers continues, it seems likely that dealers will be forced to operate under such highly restricted conditions that marketing costs will be increased. Divorcing of consignment and purchasing functions will probably result in duplication of function and increased costs. There is no question that malpractices by dealers must be eliminated if they exist, but there is grave danger that in this elimination many advantageous

practices will also be curtailed, and possibly cumbersome governmental regulation may be brought about.

The woolen and worsted industry is similar to the cotton-textile industry in having a number of mills producing standardized products such as tops, yarns, and fabrics, all of which are sold by specification principally on a price basis. Conditions are particularly unstable in this industry where excess capacity exists. The lack of direct contact between these mills and the ultimate consumers, which prevents prompt and complete information on consumer preferences from being passed back to the mills, also adds confusion to a situation already dangerously unbalanced. Beyond a doubt this state of affairs has caused many of the difficulties in the industry, particularly when sufficient emphasis has not been placed on ultimate consumer demand.

As a consequence, many mills suffer from poor forecasts as to the demands of a particular season. The problems are intensified by the shortening of the style cycle and the increasing tendency of garment manufacturers and retail establishments to buy on a hand-to-mouth basis. This policy leaves the mills with the problem of producing style goods in sufficient quantities and of proper designs, and at the same time of avoiding inventory surpluses that will decline in value at the end of a short selling season.

The problem of cancellation of orders is a serious one, resulting in frequent financial losses to the mills. The operating methods of the industry are conducive to a continuation of this practice unless aggressive efforts are made to stamp it out. The practice of garment manufacturers, during a period of rising prices, of ordering larger quantities than they can possibly use stimulates the market artificially and makes the later cancellations even more disastrous. The garment manufacturers are encouraged in these practices by the sales policies of the mills, for in their eagerness to make sales, they may make too many concessions to a particular customer with regard to cancellation privileges, adjustment in prices, and delivery terms. The fact that cancellations are reported as part of the statistics of the trade indicates the complacent attitude of the mills toward this abuse of sales contracts. From this situation, it is apparent that the woolen and worsted industry needs more effective business leadership. Even with some improvement in these conditions, there is little hope for

profitable operations of mills whose management is not alert to changes in demand, is not sufficiently ingenious and imaginative in the styling of its fabrics, and whose organizations and methods of operation are not sufficiently flexible to fit in the peculiar marketing framework which has been established in this industry.

The Associated Wool Industries has emphasized the necessity of making the public "wool conscious" through publicity. This organization also has proposed to make reports on fashions and styles, consumption data, and possibilities of new uses. The latter part of the program is admirable, but it is proposed on the assumption that manufacturers will actually make use of the information. That they will do so intelligently has not yet been demonstrated. The industry's problem, however, will not be solved by a general appeal to "use more wool," but by the production of fabrics of the type and design that consumers not only will like but will prefer to fabrics made from other fibers. It is also necessary that the prices for woollen fabrics should not be too far out of line with those of competing clothing materials.

The real solution to the problem will come, not alone from concerted action by the entire industry, but from the innumerable decisions that the operating executives will make from day to day as to what designs shall be produced, what new fabrics developed, and what operating economies introduced to reduce costs and prices. These decisions must be guided by a constant, intelligent awareness of consumer demand.

Furthermore, it is not inconceivable that the industry will face competition from synthetic wool fibers within a few years. Synthetic wools have already been commercially produced from milk or casein in Italy, and in the laboratories of this country. Even if such fabrics are not produced commercially, substitution of cotton, rayon, and silk for wool has already occurred. An opportunity exists for some of the aggressive mills to experiment with fabrics made of wool mixed with other fibers, since one of the principal reasons for the decline in the consumption of wool is its relatively high price. Imaginative and intelligent designing can possibly create fabrics made principally of wool but with a sufficient amount of synthetic or other fibers to reduce the price of the finished fabric to a point where it will move promptly into channels of consumption. If this is done on a sufficiently broad

and imaginative scale, the total consumption of wool may be stimulated.

Dependence on tariff protection will not be the salvation of either the growers or the manufacturers. In fact, it seems probable that the soothing effects of a high tariff have led some executives to believe that profits can be guaranteed by tariff laws, and that aggressiveness and ingenuity are not so necessary under such conditions.

Some liquidation of investment and equipment has already occurred in the industry, and there is likely to be more of it. Although the outlook for the industry today is not bright, current conditions offer a challenge to the aggressive members of the industry.

CHAPTER IX

SUMMARY AND CONCLUSIONS

RELATIONSHIP OF PROBLEMS OF AGRICULTURAL INDUSTRIES TO PROBLEMS OF AGRICULTURE

The characteristics of the industries described in the preceding chapters and the principal problems confronting their business organizations are on the whole distinctive in many essentials from those of other types of industries. Furthermore, the problems not infrequently differ in each of the geographical areas producing a particular commodity. Hence, the problems of any individual processor differ in certain aspects from those of his competitors located elsewhere, while in other aspects he faces general industry problems, and in still others he is confronted by the broad problems common to all agricultural industries, and indeed to all other industries.

The milk distributor in New England who has met all the qualifications for distributing Grade A milk for the Boston market has problems which differ materially from those of the Minnesota or Wisconsin cheese and butter producer, and the problems of each are quite different from the procurement and merchandising problems of the southern cotton shipper or tobacco manufacturer. While the principal questions of policy which require the attention of executives in each industry have been discussed, there remain the still broader questions which must be approached from the viewpoint of all the agricultural industries together.

First are the underlying problems of agriculture itself; these problems affect not alone the farmer but also the handlers and processors of his output. There has been much confused and distorted thinking in attempting to present solutions to "*the farm problem.*" There is no one farm problem, but there are many, and the problems and solutions vary with the commodity. As a further complication, many analyses of these problems have been presented from a single point of view, such as that of all farmers, of the government, or of the marketing of all farm products.

Many of these solutions have been colored by highly emotional presentations; they have pictured the plight of the neglected and downtrodden agricultural producers, the crushing force of powerful monopolies which reduce the prices of agricultural products and the incomes of the farmers, and the machinations of shrewd speculators who take money out of the farmers' and the consumers' pockets by manipulating futures prices. Other solutions fail to take into account the possible alternatives which must be considered if a particular scheme fails to achieve its purpose.

Foremost among the problems of the farmer is that of agricultural surpluses. This problem is elusive but pressing; no simple answer apparently exists for it. Government programs on a vast and complex scale have, in some instances at least and almost surely temporarily, brought some relief. The direction has been that of subsidized control of crops and markets, a direction which has proved not only expensive but confusing. Control is rendered uncertain by the difficulties of adequate forecasting of domestic demand factors, by the uncertainties of a foreign policy at present based on reciprocal trade treaties, and by the impossibility of obtaining cooperation from a usually bountiful but always erratic Mother Nature.

As producers primarily of necessities, farmers generally have been affected adversely by the decrease in the rate of growth of the population of this country. Agricultural production, the intensive use of existing farm lands, and the expansion of other lands have been based on a constant increase of consumption. Growth of population provided this increase in consumption for many years, but it is certain it will not do so in the future. As an added problem, export markets have been shut off by trade barriers resulting from the increasing tendency of many nations to become self-sufficient in regard to both peacetime and wartime necessities. The reduction in demand followed an expansion of farm production during the World War, when producers were urged not only by high prices but by patriotic appeals to plant and produce more.

Aside from long-term tendencies and hazards of weather, farm production may be classified as stable rather than flexible. Farm capital and the farmer's family, which provides him with most of his labor, are not in general mobile and cannot be adjusted readily to changing conditions. Farmers as a group find it

difficult to make necessary adjustments which may require a change of location, a change of crop, or even the introduction of new methods.

The farmers' approach to a solution of the many agricultural problems must involve both an understanding of the difficulties and a clarification of conditions that can be expected to bring improvement, as well as the means by which such improvement can be obtained. The farmers have demanded, along with the rest of the nation, an income to provide a higher standard of living. In some cases it seems clear that the agricultural and economic system cannot contribute an income of such amount, and that farmers are demanding a higher standard of living than they can afford under the present system which requires from the sale of a single crop sufficient income to support the farmers' families throughout the year and to make payments on the land, on automobiles and tractors, and on other expensive farming equipment.

Some farmers are depending primarily on domestic markets and others on foreign markets. The declining rate of increase in population and changes in diet, habit, custom, and purchasing have resulted in dwindling markets for some farm products. Trade barriers, self-sufficiency programs, nationalism, and high tariffs have resulted in declines in demand for other products, or have accentuated the loss in domestic markets. Decline in business activity has affected both markets, and the farmer is paid lower prices. All these difficulties cannot be eliminated for all farmers, and low prices are sometimes essential for the development of new uses. But from the standpoint of the farmer, price and income are all-important, and anything that does not contribute to an increase is a complete failure from the farmer's point of view.

Some of the more intelligent farmers are taking one approach which removes this emphasis. The farmer who depends upon a cash crop to provide all his income is more susceptible to the difficulties described above than a farmer operating a "depression-proof" productive unit supplying him with his principal needs for living and additional cash for his other essential needs. An increase in acreage for foodstuffs for consumption on the farm itself will decrease the acreage devoted to cash crops and will supply the farm with a large proportion of its annual requirements.

There are many developments, both in improvement of strain and in fertilizing and cultivating techniques, which give promise of increasing yields per acre. Thus the total supply of a crop may not necessarily be reduced by transferring some acreage to subsistence crops; by maintaining this supply and letting the price seek its economic level, however, new uses may be stimulated for the crop. The important point is to take the emphasis off the single cash crop, which may or may not produce an adequate income. By such concentration, it has been said that the farmer sells at wholesale and buys at retail. By concentrating on the production of the family needs, less dependence is placed on the sale of a standardized product in a competitive market, where prices are likely in many years to be low.

The increase in mechanical farming and in skilled techniques applied to agriculture is likely to continue, and, as in industry, it is likely that the skilled farmer will be paid more per hour of labor, while the unskilled farmer will suffer from smaller returns and may even encounter the same difficulties as the unskilled worker in industry in making a place for himself in the economic system. These individual cases are tragic and deserve sympathy and help, but it should not be assumed that they constitute the majority of the farmers or that their problems are the most significant and important.

The question as to how much of the consumer's dollar should go to the farmers is another problem which has been distorted by a failure to include all the facts in the argument. Direful tales of the declining proportion of the farmer's share of the consumer's dollar have evoked tearful comments on the injustice of it all. There has been, however, a definite improvement in the form in which the farmers' products are delivered to the consumer, and the consumer has demanded additional service and additional protection, which have resulted in increased costs of processing and of distribution. The housewife wants milk of a standard and guaranteed sanitary quality delivered on her doorstep each day. The processing equipment and the organization required to provide this service more than triple the initial cost of production of milk on the dairy farm. The consumer is not interested in milk on the farm, however, but wants it delivered fresh for use each morning. Similarly, a side of beef costs less per pound than a sirloin steak "about an inch thick," but the housewife wants a

single steak for dinner and does not want the expense and inconvenience of handling a whole side of beef or the monotony of serving nothing but beef until a whole side or whole steer is consumed by her family. Cotton goods must be finished, styled, and designed in attractive fashion, for the consumer is interested in securing a fabric for a particular use.

Thus, new business functions have been introduced between the farmer and the consumer, based upon necessity in selling the product; these new functions have absorbed a substantial proportion of the consumer's dollar. Without this added increment of science and technique applied to production and selling, the farmer might have continued to get a larger *proportion* of the consumer's dollar, but the number of dollars received by the farmer would have been pitifully small.

Under these circumstances it is extremely shortsighted for the farmer to consider the processor and handler of agricultural products as an inevitable antagonist. Both are concerned with making the farmer's product more attractive to the consumer and encouraging the use of it in greater quantities. To this extent the farmer's interests are identical with the business interests of the agricultural industries. It is essential that farmers, their representatives, and groups of organized farmers recognize this important contribution, although it must be readily admitted that it is easier to make such statements than it is to convince each individual farmer of the logic of the argument.

Nevertheless, the agricultural industries cannot ignore the problems of the farmers. Attempted solution of these problems by the government has resulted in government control of some milk markets and the prices paid producers; the price-pegging experiments and the large loans made on cotton; loans on wheat; complete control over the production, labor costs, and supplies of sugar; compulsory inspection of tobacco; and an investigation of the marketing of wool.

Government regulation, spurred on by all sorts of pressure groups to extend control schemes, constitutes one of the most important problems of the agricultural industries. All industry is faced with problems of adjusting its operations to government control in such areas as wages and hours, employee relations, and capital financing. But the agricultural industries are also faced

with either the actuality or possibility of control over raw material supplies, prices, and volume of operations.

These cumbersome and complex schemes to control the supply and price which have been superimposed on an exceedingly complicated marketing system have raised many problems for the administrators of the control schemes and even more for the executives of the agricultural industries who must adapt their operating policies to these controls. An added difficulty is the barrier which is automatically erected between government officials and businessmen by the institution of such controls. The administrative officials find it difficult to consult with experienced business executives, since such close contact would open the officials to the charge of unfair discrimination and unholy alliance. Consequently, the executives must too often grope along attempting to guess what the government's decisions will be. This constant fear of sudden and far-reaching decisions which will directly affect the operations of the companies creates an unstable industry. Furthermore, industry progresses because of its organization and its establishment of routine and carefully planned methods. Sudden changes in these organizations and methods not only breed confusion and inefficiency but increase costs and retard development.

The agricultural industries, with tremendous capital outlays, expensive and complex techniques, and frequently long and difficult processes, are ill-adapted to move quickly enough to cooperate intelligently and wholeheartedly with hurried schemes to aid the farmer in time to save an ensuing election. Particularly is this true when government's plans for agriculture involve drastic and changeable crop control devices and price manipulations, both of which affect to a large degree the processor's costs and his merchandising plans.

Under these conditions, industry must adopt an aggressive policy if for no other reason than to keep the farmers and their representatives aware of the fact that industry, as well as government, is concerned with the problems of agriculture. Otherwise, industry may suffer from overemphasis on the control of prices and production, from rigid restrictions which hamper worth-while activities, and from activity for the sake of action.

Aggressive and constructive effort by the agricultural industries may take any one of a number of forms. Some suggestions

can be developed by studying past decisions and policies that have directly benefited farmers producing a particular commodity. The most effective and lasting help has been the stimulation or creation of demand for agriculture's processed products; and, in this effort, and in their aggressive leadership many companies have assisted the farmers as well as themselves.

The increase in consumption of cigarettes, effected by intensive advertising campaigns on the part of the tobacco manufacturers, increased the demand for flue-cured tobacco to the point where additional thousands of acres of land were required to produce the necessary amounts of this type of tobacco. In south Georgia, where the boll weevil had practically eliminated Sea Island cotton and where other cotton land was unprofitable after war demands resulted in increased acreage, the production of flue-cured tobacco provided an outlet for the efforts and lands of farmers. Production of this type of tobacco increased to the point where it became the principal source of income in certain areas of southern Georgia, South Carolina, and the new tobacco areas of North Carolina.

The corn-products industry has not provided such a spectacular increase in the demand for corn, but demand has been enlarged by the development of new uses and by the perfection of chemical techniques in extracting new products from corn. The farmers producing corn for commercial markets have been the beneficiaries of a new demand for their product created by the business organizations engaged in processing this commodity.

The meat-packing industry provided new outlets for the livestock producer and opened new markets by the development and use of the refrigerator car. Central and country markets were developed where large producers of livestock could sell their animals at any time of the year. Progress in the utilization of by-products has not only increased the profits of the meat-packing concerns but has increased the value of the livestock shipped to market by the producer.

The milk distributors have perfected an amazingly efficient distribution system for the daily delivery of fresh milk to millions of homes. The organization required to handle this product promptly and efficiently is complex and has required many evidences of managerial skill both to create it and to keep it functioning. In the process, of course, a relatively steady market for the production of the dairy farm has been provided, and these

producers have been the beneficiaries of a large cash income for their efforts.

The industrial uses of cotton which have been developed by the textile manufacturers have prevented the cotton farmer from suffering greater hardships as foreign demand, as well as domestic demand for cotton for clothing uses, has dwindled. The development of the automobile industry has provided an opportunity for textile manufacturers to produce for new markets, and tire fabrics and other cotton goods have been developed for these uses. The cotton farmer needs many more such markets before his problems will be solved, but attempts are being made in many different fields to stimulate new uses for cotton.

The possibility of developing new uses for agricultural commodities and creating new outlets for the surplus production of the farm is one of the most important areas of investigation. Chemical research, adaptations of existing techniques, market and demand research, and effective merchandising programs can be utilized in an attempt to use economically the products of the farm. The element of price is also important in this situation, since substantially increased prices may curtail rather than expand new uses. But new markets will prevent prices from dropping to new low levels.

The possibility of the development of new agricultural industries requiring acres of farm land formerly devoted to producing a surplus of some agricultural commodity is remote in terms of a solution for problems within six months or a year. New business organizations, new mechanisms of distribution, and new users for the products created are not developed overnight. But over a longer period, such developments hold great promise for the farmer. In the last few years, the soybean industry has developed in the United States to a point where 6,000,000 acres are now planted to this crop as compared with 2,000,000 ten years ago. There is every expectation that such growth will continue, and continue to require an increasing number of acres for the production of this crop.

There is every likelihood that new industries will develop by the discovery of new uses for some of the staple commodities already grown in large quantities. The corn-products refining industry has many potentialities; for instance, the development of processes whereby the corn bran could be used to produce

rayon would change the structure of the industry and provide a new market for corn. The attempts to produce commercial alcohol from corn and the development of new fuel for motor vehicles from this production have not yet developed commercial importance, but progress in chemical research may speed the development of these and similar enterprises, pending the possible exhaustion of our oil resources. The use of cotton in road building, for bale wrapping, and for other new purposes will develop slowly, but the important fact is that such uses should be investigated and developed as rapidly as possible.

The planting of tung trees, to produce the nuts from which tung oil, an important ingredient of varnish now imported in large quantities from China, is extracted, may require an increasing proportion of the cotton land of the South. The development of paper-making processes, whereby slash pine can be used as raw material, will also provide a new use for the eroded red clay hills of the southern Piedmont and coastal sections and provide a new center of attention for some of the farmers formerly concentrating entirely on the production of cotton. The development of the plastics industry offers many opportunities for the use of agricultural products.

These are merely examples of the type of progress to be expected and are neither a complete summary of all the possibilities nor an appraisal of their future significance. They emphasize the point, however, that imaginative research, aggressive merchandising, able management, and capital are essential components of the development of new uses for agricultural products. Business and industry can and must play an important role in the search for solutions to farmers' problems and a way out of the present dilemma. As in the past, industry must be depended upon for a major share of the progress of agriculture.

With additional emphasis on new markets, the established outlets must not be neglected. The decline in the amounts of corn consumed by the dry-milling process has not been compensated for by an increase in demand from the new industry created by the wet-milling process; the net result to the corn farmer has been a loss of markets.

Methods of attack other than the creation of new demands can be made by industry on the problems of agriculture. The approaches must of necessity vary with each industry, since the

circumstances differ in each. But there is one common point, namely, that the agricultural industries must be aware of their position as important cogs in the machinery which moves agricultural products from the farm to the ultimate consumer. To ignore their relation to the farmers is disastrous for the farmer, the processor, and handler alike.

There is great need for a broader demonstration of specific cooperation between farmers and processors. Effective cooperation cannot be accomplished by mere lip service on the part of either group. The interests of both groups are closely related, and further cooperation can be achieved in such matters as the wider dissemination of standards of quality required by the processors and types of commodities which to their minds need improvement, a closer approximation of processors' standards of purchasing to the standards known to the farmers, the development of buying methods which insure fair payment to the farmer for the recognizable qualities of his product, and active assistance to farmers in the peak marketing periods which sometimes are unsatisfactory to the producer and to the processor.

The tobacco companies, for example, could probably assist farmers and remove criticism by an aggressive attempt to make their buying standards known to the producers. The tobacco companies make a great point of their peculiar and individual requirements and use this necessity for great care in selecting raw materials as a selling point in their advertising campaigns. The fact remains, however, that the secrecy with which they cloak their buying standards arouses the farmers' suspicions. Certainly some information can be made effectively available to the farmer, to give him a clearer understanding of grades and prices. Whether this can be accomplished through government grading is subject to debate, but, in any event, the dissemination of information would assist in removing some of the criticisms raised when a farmer's entire production for the year is appraised and sold within the short space of ten seconds.

Some of these aims can be achieved through farmers' cooperatives. Farmers need to be educated and enlightened, and for this reason it is possible that farmers' cooperatives should be encouraged, not as a complete solution to the many problems but as an excellent way to make the farmer business-minded and acquaint him with the problems and difficulties faced by concerns operating

in this field. Many of these cooperatives can also serve as effective means of uniting the farmers and giving them a clearer understanding of their joint problems, especially when these organizations can perform business functions efficiently and contribute to the stability and smoothness of the marketing mechanism which has been erected for a particular commodity. There is no doubt that some of the dairy cooperatives have assisted both the farmers and the distributors; they performed a needed function in some areas. Distributors may be able to solve some of the problems existing in the milk markets by working more closely with the representatives of the farmers. The allocation of surplus milk, its use, and the establishment of its price are matters which can be worked out effectively and harmoniously only through active cooperation and negotiation with producers or their representatives.

The problems of price and purchasing harass the processor, but these same problems are in turn also of vital importance to the producer. It is impossible for industry to pay higher prices than demand justifies, and industry cannot support farmers as a part of a social security scheme. Neither can it pay labor nor employ workers in greater numbers without some regard to the financial position of the company. But progress is being made in developing plans which save laborers from the most crushing effects of a business depression and which may not prove unduly burdensome to the companies adopting such plans. Something of the same type of approach might be used to minimize some of the difficulties of farm producers and to avoid the worst difficulties arising from marketing systems which break down when farmers harvest an unusually large crop, or when prices are depressed by the weight of unseasonable supplies.

There is not yet sufficient evidence to indicate that crop insurance is the solution. The single year's experience when the wheat crop was more than adequate is hardly a fair test. In addition, the crop insurance plan is very wisely concerned only with insuring yield and not with insuring price or a definite financial return. On the other hand, the approach in this area seems definitely better than in some of the other plans for agricultural relief. Steps are being taken slowly and in an experimental attitude. Certainly the experience gained in the operation of this plan will be useful in the future.

By recognizing that it is good business to help the farmer solve his problems, some aggressive efforts can be made to analyze the causes of the difficulties in order to determine where improvements and changes can be made. Processors cannot peg prices, store inventories far beyond their current or expected needs, or change their entire operating policy when farmers are experiencing difficulty. But they can work with representatives of the farmers in developing emergency programs for the distribution of surplus supplies and for changes in purchasing methods whereby farmers will be benefited and processors will not be penalized too greatly. The cooperation between the food chains and certain of the farmers' cooperatives illustrates the effectiveness of well-organized programs to assist the farmers when a surplus of a particular commodity results from a bumper crop. Consumption has been stimulated by the combination of aggressive advertising and low prices, and the farmers' surplus has been moved to market. This method of approach seems eminently more satisfactory than destroying commodities, restricting production, government storage and loans, or the distribution of commodities free or at an absurd price, with the government acting in the role of a competitor of existing business institutions.

Such plans require wholehearted cooperation on the part of the companies in an industry, and such cooperation is sometimes eyed with suspicion by the Federal Trade Commission or the Department of Justice. Complete cooperation cannot always be secured even in industries composed of a relatively small number of companies. Additional complications arise from the distinctive features of each commodity, from trade custom, and from the unwillingness of companies to take aggressive action in these areas. But there is no doubt that some attempts must be made, even though policies and decisions must be changed as details of operation reveal new difficulties.

The Agricultural Committee of the National Association of Manufacturers has attempted to study some of these problems and has issued several declarations of policy in dealing with matters of this type. Because of the wide variations in the types of problems in the agricultural industries, it seems unlikely that such a committee, representing all industries, could or should inaugurate the type of program described above. If solutions are found, they cannot be applied to all industries, and some

effective organization must be created for each industry to work with the distinctive problems of the commodity involved.

On the other hand, the efforts of such organizations as the newly created Cotton Council, the National Association of Food Chains, and the National Association of Wool Manufacturers have tremendous opportunities for exerting leadership in furthering consumption and in attacking those specific problems which too often prevent harmonious cooperation between agricultural producers and their ancillary processors and distributors.

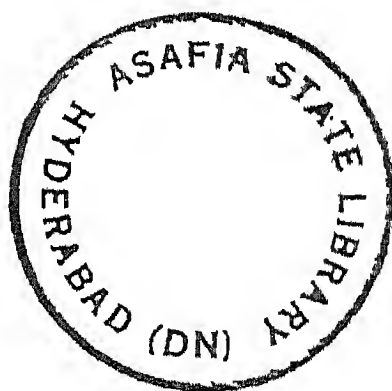
The part which the government should play in endeavoring to find satisfactory solutions to agricultural problems cannot be defined with exactness where the circumstances vary so widely for each problem. The function of central governmental administration is a matter of some considerable controversy in these troubled times. In a democracy, however, it seems clear that a truly representative government should consider, in so far as possible, the needs and problems of all groups. The interests of one group cannot be subordinated, and cannot be ignored, to concentrate on the interests of another group. Furthermore, the agricultural industries by the very nature of their function have contributed more through the years, and will continue to contribute more, to a satisfactory solution of farm problems than government can hope to do.

On the other hand, wise cooperation by government is an essential in a land of such great resources and of such varied activities as we possess. One progressive step has been taken by the government in the appropriation of \$4,000,000 in the Farm Act of 1938 for the establishment of four regional research laboratories for the development of new uses and new outlets for farm products. Government assistance to create new uses through chemical research is justified and necessary in such areas as this and in the extension of the work of the agricultural experiment stations. More money spent for this type of assistance and less for control will, in the long run, aid in the establishment of a more stable and a more profitable agriculture.

The government, of course, must deal with the problems of exported commodities, since these are now national problems throughout the world and have highly complex and important international significance. The reciprocal trade agreements initiated by this country in recent years are of potential value to

agriculture. But this potential value cannot be realized without the utmost consideration both of international policy and of effect on our internal agricultural situation. The programs of the Department of State and Department of Agriculture need to be carefully coordinated in order that the farmers of this country and the markets for their products in foreign countries may not be adversely affected. If we are to stimulate imports as well as exports of competitive agricultural commodities, at least care must be taken that we do not curtail production within this country, at public expense, only to hold the umbrella over foreign-produced substitutes.

Emphasis must be placed on the necessity of examining all phases of the problems of the farmers, from the planting of the crop to the final disposition of the product by the ultimate consumer. The agronomists and botanists, the agricultural economists, the students of farm management, the sociologists interested in resettlement and the establishment of subsistence farms, the cooperative experts, the government administrators, the executives in the agricultural industries, and the consumers and taxpayers will all be called upon to contribute some share to the solution of the complex problems of agriculture. Solutions must be evolved if America is to endure, for in the last analysis we are primarily an agricultural nation, obtaining from the varied soils and climates of the nation a great annual wealth, which, through the labor and administration of our factories and merchandising organizations, feeds and clothes our people and provides them in innumerable ways with the material comforts which go to form our standards of living.



SELECTED BIBLIOGRAPHY

GENERAL

- BAER, JULIUS B., and WOODRUFF, GEORGE P. *Commodity Exchanges*. New York: Harper & Brothers, 1929.
- BAKKEN, H. H., and SCHAAARS, M. A. *The Economics of Cooperative Marketing*. New York: McGraw-Hill Book Company, Inc., 1937.
- BIDWELL, P. W., and FALCONER, J. L. *History of Agriculture in the Northern United States, 1620-1860*. Washington: The Carnegie Institution, 1925.
- BLACK, JOHN D. *Agricultural Reform*. New York: McGraw-Hill Book Company, Inc., 1929.
- BOGART, E. L. *Economic History of American Agriculture*. New York: Longmans, Green & Company, 1923.
- BOGART, E. L., and THOMPSON, C. M. *Readings in the Economic History of the United States*. New York: Longmans, Green & Company, 1925.
- BOYLE, JAMES E. *Marketing of Agricultural Products*. New York: McGraw-Hill Book Company, Inc., 1925.
- CARRIER, LYMAN. *The Beginnings of Agriculture in America*. New York: McGraw-Hill Book Company, Inc., 1923.
- CLARK, FRED E., and WELD, L. D. H. *Marketing Agricultural Products in the United States*. New York: The Macmillan Company, 1932.
- DAVIS, JOSEPH S. *On Agricultural Policy, 1926-1938*. Stanford University Food Research Institute. Stanford: Stanford University Press, 1939.
- DOWELL, A. A., and JESNESS, O. B. *The American Farmer and the Export Market*. Minneapolis: University of Minnesota Press, 1934.
- FREDERICK, JOHN H. *Agricultural Markets*. New York: Prentice-Hall, Inc., 1937.
- GEE, WILSON. *The Social Economics of Agriculture*. New York: The Macmillan Company, 1932.
- GRAS, N. S. B. *A History of Agriculture*. New York: F. S. Crofts & Company, 1925.
- HOFFMAN, G. W. *Future Trading Upon Organized Commodity Markets in the United States*. Philadelphia: University of Pennsylvania Press, 1932.
- M McNAIR, MALCOLM P., and LEWIS, HOWARD T., Editors. *Business and Modern Society*. "Agriculture—The Great Dilemma," by Deane W. Malott. Cambridge: Harvard University Press, 1938.
- MALOTT, DEANE W. *Problems in Agricultural Marketing*. New York: McGraw-Hill Book Company, Inc., 1938.
- NOURSE, E. G. *Marketing Agreements Under the AAA*. Washington: The Brookings Institution, 1935.
- NOURSE, E. G., DAVIS, J. S., and BLACK, JOHN D. *Three Years of the Agricultural Adjustment Administration*. Washington: The Brookings Institution, 1937.
- PARKINS, ALMON E. *The South, Its Economic-Geographic Development*. New York: John Wiley & Sons, Inc., 1938.

- PEEK, G. N., and CROWTHER, SAMUEL. *Why Quit Our Own?* New York: D. Van Nostrand Company, Inc., 1936.
- SCHAFER, JOSEPH. *The Social History of American Agriculture.* New York: The Macmillan Company, 1936.
- SCHMIDT, L. B., and ROSS, E. D. *Readings in the Economic History of American Agriculture.* New York: The Macmillan Company, 1925.
- SCHULTZ, HENRY. *The Theory and Measurement of Demand.* Chicago: University of Chicago Press, 1938.
- SPARKS, EARL S. *History and Theory of Agricultural Credit in the United States.* New York: The Thomas Y. Crowell Company, 1932.
- TAYLOR, ALONZO E. *The New Deal and Foreign Trade.* New York: The Macmillan Company, 1935.
- U. S. Department of Agriculture. Agricultural Adjustment Administration. *Agricultural Adjustment, 1933-1935.* Washington: Government Printing Office, 1936.
- . Agricultural Adjustment Administration. *Agricultural Conservation, 1936.* Washington: Government Printing Office, 1937.
- . Agricultural Adjustment Administration. *Regional Problems of Agricultural Adjustment.* Washington: Government Printing Office, 1935.
- . *Agricultural Statistics* (annual). Washington: Government Printing Office.
- . *Barriers to Internal Trade in Farm Products*, by George R. Taylor, Edgar L. Burtis, and Frederick V. Waugh. Washington: Government Printing Office, March, 1939.
- . Bureau of Agricultural Economics. *World Trade Barriers in Relation to American Agriculture.* Senate Document No. 70, Seventy-third Congress, First Session. Washington: Government Printing Office, 1933.
- . Miscellaneous Publication No. 88. *The United States Department of Agriculture*, by M. S. Eisenbower and A. P. Chew. Washington: Government Printing Office, 1930.
- . Miscellaneous Publication No. 251. *A History of Agricultural Experimentation and Research in the United States, 1607-1925*, by A. C. True. Washington: Government Printing Office, 1937.
- . *Yearbook of Agriculture* (annual). Washington: Government Printing Office.
- U. S. Farm Credit Administration. Annual Reports.
- U. S. Federal Farm Board. Annual Reports (First, Second, and Third). Washington: Government Printing Office, 1930, 1931, and 1932.
- U. S. Federal Trade Commission. *Agricultural Income Inquiry*, Parts I, II, and III. Washington: Government Printing Office, 1938.
- . *Cooperative Marketing.* Senate Document No. 95, Seventieth Congress, First Session. Washington: Government Printing Office, 1928.

MILK AND DAIRY PRODUCTS

- American Municipal Association, Publication No. 57, Public Administration Service. *Milk Control, Governmental Regulation of the Dairy Industry in the United States.* Chicago: 1937.
- BAKKEN, H. H., and SCHAARS, M. A. *The Economics of Cooperative Marketing.* New York: McGraw-Hill Book Company, Inc., 1937.

- BLACK, JOHN D. *The Dairy Industry and the AAA*. Washington: The Brookings Institution, 1935.
- BOYLE, JAMES E. *Marketing of Agricultural Products*. New York: McGraw-Hill Book Company, Inc., 1925. Chap. XVIII.
- BROWN, E. F. *The Effect of Evaporated Milk Consumption on Fluid Milk Sales in the United States, 1935*. New York: Milk Research Council, Inc. (Mimeographed), 1935.
- CASSELS, JOHN M. *A Study of Fluid Milk Prices*. Cambridge: Harvard University Press, 1937.
- FREDERICK, JOHN H. *Agricultural Markets*. New York: Prentice-Hall, Inc., 1937. Chap. XIV.
- FREDERIKSEN, JOHAN D. *The Story of Milk*. New York: The Macmillan Company, 1919. Chaps. I and II.
- HAMILTON, WALTON, and Associates. *Price and Price Policies*. New York: McGraw-Hill Book Company, Inc., 1938. Section VIII.
- HUNZIKER, OTTO F. *The Butter Industry*. 2d ed. LaGrange, Illinois: Privately printed, 1927.
- Illinois Agricultural Experiment Station. Bulletin 397. *Prices and Consumption of Milk in Specific Cities*, by R. W. Bartlett. Urbana: January, 1934.
- JUDKINS, HENRY F. *The Principles of Dairying*. New York: John Wiley & Sons, Inc., 1925.
- KING, CLYDE L. *The Price of Milk*. Philadelphia: John C. Winston Company, 1920.
- MOJONNIER, TIMOTHY, and TROY, HUGH C. *The Technical Control of Dairy Products*. 2d ed. Milwaukee: C. N. Casper Company, 1925.
- NOURSE, E. G., DAVIS, J. S., and BLACK, JOHN D. *Three Years of the Agricultural Adjustment Administration*. Washington: The Brookings Institution, 1937. Chap. VIII.
- Pennsylvania Agricultural Experiment Station. Technical Paper No. 659. *The Consumption of Fluid Milk and Other Dairy Products in Philadelphia, Pennsylvania, June, 1934*, by T. K. Cowden and Alexander Sturges. State College: Mimeographed, July, 1934.
- RENNE, R. R. *The Tariff on Dairy Products*. Madison: Tariff Research Committee, 1933.
- SNODGRASS, KATHERINE. *Margarine as a Butter Substitute*. Stanford University Food Research Institute. Fats and Oils Studies No. 4. Stanford: Stanford University Press, December, 1930.
- THOMSEN, F. L. *Agricultural Prices*. New York: McGraw-Hill Book Company, Inc., 1936. Chap. XVIII.
- TOBEY, JAMES A. *Legal Aspects of Milk Control*. Chicago: International Association of Milk Dealers, 1936.
- U. S. Department of Agriculture. Agricultural Adjustment Administration, Consumers' Counsel Division. Publication No. 2. *A Survey of Milk Consumption in 59 Cities in the United States*. Washington: Government Printing Office, June, 1936.
- . Agricultural Adjustment Administration, Dairy Section. Series on Marketing Agreements and Orders, Paper No. 12. *Economic Brief with Respect to the Proposed Amendment to Order No. 4 for the Greater Boston, Massachusetts, Marketing Area*. Washington: Mimeographed, 1937.

- . Agricultural Adjustment Administration, Division of Marketing and Marketing Agreements, Dairy Section. Marketing Information Series DM-1. *A Survey of Milk Marketing in Milwaukee*. Washington: Government Printing Office, 1937.
- . Agricultural Adjustment Administration, Division of Marketing and Marketing Agreements, Dairy Section. Marketing Information Series DM-2. *Some Problems Involved in Establishing Milk Prices*, by E. W. Gaumnitz and O. M. Reed. Washington: Government Printing Office, 1937.
- . Technical Bulletin No. 73. *Some Factors Affecting the Demand for Milk and Cream in the Metropolitan Area of New York*, by H. A. Ross. Washington: Government Printing Office, 1928.
- . Technical Bulletin No. 179. *Cooperative Marketing of Fluid Milk*, by Hutzler Metzger. Washington: Government Printing Office, 1930.
- U. S. Farm Credit Administration. Cooperative Division. Bulletin No. 3. *Cooperative Marketing of Agricultural Products*, by Ward W. Fetrow. Washington: Government Printing Office, 1936.
- . Bulletin No. 11. *Organization and Operating Problems of Nebraska Cooperative Creameries*, by T. G. Stitts and Gordon C. Loughlin. Washington: Government Printing Office, 1937.
- . Bulletin No. 14. *Cooperative Organization of Iowa Farmers' Creameries*, by Frank Robotska and Gordon C. Loughlin. Washington: Government Printing Office, 1937.
- . Bulletin No. 16. *Milk Cooperatives in Four Ohio Markets*, by William C. Welden and T. G. Stitts. Washington: Government Printing Office, 1937.
- . Bulletin No. 24. *The Surplus Problem in the Northeastern Milksheds*, by Leland Spencer. Washington: Government Printing Office, 1938.
- . Circular No. C-104. *Economic Analysis of Bargaining Problems of Milk Cooperatives*, by T. G. Stitts and William C. Welden. Washington: Government Printing Office, 1937.
- . Circular No. C-105. *Cooperative Fluid Milk Associations in Iowa*, by Paul E. Quintus and T. G. Stitts. Washington: Government Printing Office, 1937.
- U. S. Federal Trade Commission. Reports on Sale and Distribution of Milk. Washington: Government Printing Office.
- . Boston, Baltimore, Cincinnati, St. Louis. House Document No. 501, Seventy-fourth Congress, Second Session. June 4, 1936.
- . Chicago Sales Area. House Document No. 451, Seventy-fourth Congress, Second Session. April 15, 1936.
- . Connecticut and Philadelphia. House Document No. 152, Seventy-fourth Congress, First Session. April 5, 1935.
- . Connecticut and Philadelphia. House Document No. 387, Seventy-fourth Congress, Second Session. January 8, 1936.
- . New York Milk Sales Area. House Document No. 95, Seventy-fifth Congress, First Session. January 5, 1937.
- . Summary Report. House Document No. 94, Seventy-fifth Congress, First Session. January 5, 1937.
- . Twin City Sales Area. House Document No. 506, Seventy-fourth Congress, Second Session. June 15, 1936.
- U. S. Tariff Commission. *Milk and Cream*. Washington: Government Printing Office, 1929.

LIVESTOCK AND MEAT PACKING

- BOYLE, JAMES E. *Marketing of Agricultural Products*. New York: McGraw-Hill Book Company, Inc., 1925. Chap. XIX.
- CARVER, ARTHUR H. *Personnel and Labor Problems in the Packing Industry*. Chicago: University of Chicago Press, 1928.
- CLEMEN, RUDOLPH A. *The American Livestock and Meat Industry*. New York: The Ronald Press, 1923.
- . *By-Products in the Packing Industry*. Chicago: University of Chicago Press, 1927.
- DALE, E. E. *The Range Cattle Industry*. Norman: University of Oklahoma Press, 1930.
- DOWELL, A. A., and JESNESS, O. B. *The American Farmer and the Export Market*. Minneapolis: University of Minnesota Press, 1934. Chap. IV.
- DUDDY, E. A., and REVZAN, D. A. *The Distribution of Livestock from the Chicago Market, 1924-29*. University of Chicago Studies in Business Administration, Vol. III, No. 1. Chicago: University of Chicago Press, 1932.
- . *The Supply Area of the Chicago Livestock Market*. University of Chicago Studies in Business Administration, Vol. II, No. 1. Chicago: University of Chicago Press, 1931.
- FEWSTER, J. DONALD. "The Packers' Consent Decree." *Harvard Business Review*, Vol. VIII, No. 3, April, 1930.
- FITZGERALD, D. A. *Corn and Hogs Under the Agricultural Adjustment Act—Developments up to March, 1934*. Pamphlet Series No. 12. Washington: The Brookings Institution, 1934.
- . *Livestock Under the AAA*. Washington: The Brookings Institution, 1935.
- FREDERICK, JOHN H. *Agricultural Markets*. New York: Prentice-Hall, Inc., 1937. Chap. X.
- Great Britain Imperial Economic Committee. *Cattle and Beef Survey*. London: His Majesty's Stationery Office, June, 1934.
- . *Mutton and Lamb Survey*. London: His Majesty's Stationery Office, September, 1935.
- Illinois Agricultural Experiment Station. Bulletin 390. *Some Important Factors Affecting Costs in Hog Production*, by R. H. Wilcox, W. E. Carroll, and T. G. Hornung. Urbana: June, 1933.
- . Bulletin No. 408. *Local Livestock Markets in Relation to Corn Belt Hog Marketing*, by R. C. Ashby. Urbana: December, 1934.
- International Institute of Agriculture. *International Trade in Meat*. Studies of Principal Agricultural Products on the World Market, No. 2. Rome: Villa Umberto I, 1936.
- JORDAN, HARRY J. *The Extension of Credit to the Livestock Industry*. Summaries of Doctoral Dissertations, Vol. IV. Chicago: Northwestern University, 1936.
- LEECH, HARPER, and CARROLL, JOHN CHARLES. *Armour and His Times*. New York: D. Appleton-Century Company, Inc., 1938.
- MCCARTY, H. H., and THOMPSON, C. W. *Meat Packing in Iowa*. Iowa University, Bureau of Business Research. Studies in Business, No. XII. Iowa City: June, 1933.
- McFALL, ROBERT J. *The World's Meat*. New York: D. Appleton-Century Company, Inc., 1927.

- NOURSE, E. G., and KNAPP, J. G. *The Cooperative Marketing of Livestock*. Washington: The Brookings Institution, 1931.
- RHOADES, E. L. *Merchandising Packinghouse Products*. Chicago: University of Chicago Press, 1929.
- SWIFT & COMPANY. *The Meat Packing Industry in America* (pamphlet). Chicago: 1931.
- TAYLOR, A. E. *Corn and Hog Surplus of the Corn Belt*. Stanford University Food Research Institute. Miscellaneous Publication No. 6. Stanford: Stanford University Press, 1932.
- TOBIN, BERNARD F. *What Becomes of the Consumer's Meat Dollar?* University of Chicago and the Institute of American Meat Packers. Studies in the Packing Industry, No. 9. Chicago: University of Chicago Press, 1936.
- U. S. Commissioner of Corporations. *Report on the Meat Packing Industry*. Washington: Government Printing Office, 1905.
- U. S. Department of Agriculture. Bureau of Agricultural Economics. *Livestock, Meats, and Wool Market Statistics and Related Data*, 1937, 1938. Washington: Government Printing Office, 1938, 1939.
- . Bureau of Animal Industry. Annual Reports of the Chief.
- . Department Bulletin No. 1440. *Factors Affecting the Price of Hogs*, by G. C. Haas and Mordecai Ezekiel. Washington: Government Printing Office, November, 1926.
- . Miscellaneous Publication No. 222. *The Direct Marketing of Hogs*. Washington: Government Printing Office, 1935.
- . Technical Bulletin No. 57. *Cooperative Marketing of Livestock in the United States by Terminal Associations*. Washington: Government Printing Office, 1928.
- U. S. Farm Credit Administration, Cooperative Division. Bulletin No. 15. *Contract Feeding and Pasturing of Lambs and Cattle*, by C. G. Randell. Washington: Government Printing Office, 1937.
- U. S. Federal Trade Commission. *Report on the Meat Packing Industry*. Washington: Government Printing Office, 1919.
- U. S. Senate. Hearings Before the Committee on Agriculture and Forestry, United States Senate, Seventy-third Congress, Second Session. *Bills to Amend the Packers and Stockyards Act, 1921*. March 14, 15, 16, 19, 20, 21, and 22, 1934.

COTTON

- COPELAND, MELVIN T. *The Cotton Manufacturing Industry of the United States*. Cambridge: Harvard University Press, 1923.
- The Cotton Textile Industry Committee and the Cotton-Textile Institute, Inc. *In the Matter of the Survey of Cotton Textile Industry Problems by the Committee of Cabinet Members Appointed by the President of the United States*. New York: 1935.
- COX, REAVIS. *The Marketing of Textiles*. Washington: The Textile Foundation, 1938.
- GARSDIE, ALSTON H. *Cotton Goes to Market*. New York: Frederick A. Stokes Company, 1935.
- HAMILTON, WALTON, and Associates. *Price and Price Policies*. New York: McGraw-Hill Book Company, Inc., 1938. Section V.
- Harvard Business School, Bureau of Business Research. Bulletin No. 70. *A Study of Cotton Hedging for a Grey Goods Mill, 1920-26*. Boston: 1928.

SELECTED BIBLIOGRAPHY

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- PEARSON, E. L. *Organization and Management in the Flour Milling Industry*. London: Sir Isaac Pitman & Sons, Ltd., 1925.
- PETERSON, C. W. *Wheat—the Riddle of the Markets*. Calgary, Canada: Farm and Ranch Review, Limited, 1930.
- PICKETT, V. G., and VAILE, R. S. *The Decline of Northwestern Flour Milling*. University of Minnesota. Studies in Economics, No. 5. Minneapolis: University of Minnesota Press, 1933.
- ROGIN, LEO. *The Introduction of Farm Machinery*. University of California. Publications in Economics, Vol. 9. Berkeley: University of California Press, 1931.
- SASS, HERBERT R. *A Carolina Rice Plantation of the Fifties*. New York: William Morrow & Co., 1936.
- SCHMIDT, L. B., and ROSS, E. D., Editors. *Readings in the Economic History of American Agriculture*. Chapter XVIII, "The Westward Movement of Wheat," by L. B. Schmidt. New York: The Macmillan Company, 1925.
- SCHULTZ, T. W. *The Tariffs on Barley, Oats, and Corn*. Madison: Tariff Research Committee, 1933.
- Stanford University Food Research Institute. *Wheat Studies*. California: Stanford University Press.
- SURFACE, FRANK M. *The Grain Trade During the World War*. New York: The Macmillan Company, 1928.
- . *The Stabilization of the Price of Wheat During the War and Its Effect upon the Returns to the Producer*. Washington: U. S. Grain Corporation, 1925.
- SWANSON, W. W., and ARMSTRONG, P. C. *Wheat*. New York: The Macmillan Company, 1930.
- U. S. Bureau of the Census. Fifteenth Census of the United States, Census of Distribution, (Agricultural Commodity Series). *Distribution of Grain*. Washington: Government Printing Office, 1934.
- U. S. Department of Agriculture. Bureau of Agricultural Economics. *Commercial Grain Stocks*. Washington: Government Printing Office, 1937.
- . Bureau of Agricultural Economics. *The Corn Picker in the Dakotas*. Washington: Government Printing Office, 1926.
- . Bureau of Agricultural Economics. *Grain Investigations, Maintaining Satisfactory Quality and Condition of Wheat Harvested with Combines in the Hard Red Winter Wheat Area, Season 1928*. Washington: Government Printing Office, 1929.
- . Bureau of Agricultural Economics. U.S.G.S.A., Form No. 90. *Handbook of Official Grain Standards of the United States*. Washington: Government Printing Office, 1937.
- . Bureau of Agricultural Economics. *The 1930 Wheat Movement As Affected by Recent Trends in Marketing*, by C. E. Campbell. Washington: Government Printing Office, 1931.
- . Bureau of Agricultural Economics. *Tariff Rates on Representative Agricultural Products Under Tariff Acts of 1930 and 1922*. Washington: Government Printing Office, 1931.
- . Bureau of Agricultural Economics. *The Wheat Situation*. Washington: Government Printing Office, Feb. 23, 1938; Mar. 23, 1938.
- . Bureau of Agricultural Economics. *World Trade Barriers in Relation to American Agriculture*. Senate Document No. 70, Seventy-third Congress, First Session. Washington: Government Printing Office, 1933.

- . Division of Botany. *The Present Status of Rice Culture in the United States*. Washington: Government Printing Office, 1899.
- . Technical Bulletin No. 459. *Classification of Wheat Varieties Grown in the United States*, by J. A. Clark and B. B. Boyles. Washington: Government Printing Office, April, 1935.
- U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. *International Competition in the Production of Wheat for Export*. Washington: Government Printing Office, 1924.
- . Bureau of Foreign and Domestic Commerce. *International Trade in Wheat and Wheat Flour*, by J. A. LeClerc. Washington: Government Printing Office, 1925.
- U. S. Farm Credit Administration. *Annual Reports*. Washington: Government Printing Office.
- . Cooperative Division. Bulletin No. 3. *Cooperative Marketing of Agricultural Products*, by Ward M. Fetrow. Washington: 1936.
- U. S. Federal Farm Board. Bulletin No. 9. *Statistics of Farmers' Selling and Buying Associations, 1863-1931*, by R. H. Elsworth. Washington: Government Printing Office, 1932.
- U. S. Federal Trade Commission. *Commercial Wheat Flour Milling*. Washington: Government Printing Office, 1920.
- . *Competition and Profits in Bread and Flour*. Senate Document No. 98, Seventieth Congress, First Session. Washington: Government Printing Office, 1928.
- . *Competitive Conditions in Flour Milling*. Washington: Government Printing Office, 1926.
- . *Wheat Flour Milling Industry*. Senate Document No. 130, Sixty-eighth Congress, First Session. Washington: Government Printing Office, 1924.
- U. S. Tariff Commission. *Wheat and Wheat Products*. Washington: Government Printing Office, 1924.
- See footnote 5, p. 226, for additional references.

SUGAR

Annual Reports of various sugar companies.

- BACKMAN, JULES. *Adventures in Price Fixing*. Farrar & Rinehart, Inc., Pamphlet Series No. 8. New York: Farrar & Rinehart, Inc., 1936.
- BERNHARDT, JOSHUA. *Government Control of the Sugar Industry in the United States*. New York: The Macmillan Company, 1920.
- California Agricultural Extension Service Circular 95. *Sugar-Beet Production in California*. Berkeley: January, 1936.
- DALTON, JOHN E. "Federal Sugar Control—A Four-Year Review." *Harvard Business Review*, Vol. XVII, No. 1, Autumn, 1938.
- . *Sugar—A Case Study of Government Control*. New York: The Macmillan Company, 1937.
- DEERR, NOËL. *Cane Sugar*. London: Norman Rodger, 1921.
- ELLIS, LIPPERT S. *The Tariff on Sugar*. Freeport: The Rawleigh Foundation, 1933.
- EMMET, BORIS. *The California and Hawaiian Sugar Refining Corporation*. Stanford: Stanford University Press, 1928.

SELECTED BIBLIOGRAPHY

473

- Facts about Sugar* (Monthly). New York: Russell Palmer Publications.
- FAIRRIE, GEOFFREY. *Sugar*. Liverpool: Fairrie and Company Limited, 1925.
- FARR & Co. *Manual of Sugar Companies*. 16th ed. New York: 1938.
- Foreign Policy Association, Commission on Cuban Affairs. *Problems of the New Cuba*. New York: 1935.
- Indian Tariff Board. *Report on the Sugar Industry*. Delhi: 1933.
- Lamborn's Sugar Statistical Bulletin* (Weekly). Lamborn & Co., Inc.
- League of Nations Publications, Series II. Economic and Financial (1937), II. B. 8. *International Sugar Conference, London, 1937*. Geneva: 1937.
- MARTIN, R. F. *International Raw Commodity Price Control*. National Industrial Conference Board Study No. 238. New York: National Industrial Conference Board, 1937.
- ROBERTSON, C. J. *World Sugar Production and Consumption*. London: John Bale, Sons & Danielsson, Ltd., 1934.
- ROWE, J. W. F. *Markets and Men*. New York: The Macmillan Company, 1936.
- SCHULTZ, HENRY. *The Theory and Measurement of Demand*. Chicago: University of Chicago Press, 1938. Chap. VI.
- TAUSSIG, F. W. *Some Aspects of the Tariff Question*. 3d ed. Cambridge: Harvard University Press, 1931.
- U. S. Cane Sugar Refiners Association. *Sugar Economics, Statistics and Documents*. New York: 1938.
- U. S. Department of Agriculture. Agricultural Adjustment Administration. *Agricultural Adjustment, 1933-1935*. Washington: Government Printing Office, 1936.
- U. S. Bureau of Agricultural Economics. *The World Sugar Situation, 1937*. Washington: October, 1937.
- U. S. Department of Agriculture. Circular No. 476. *Evaluation of Sugar-Beet Types in Certain Sugar-Beet Growing Districts in the United States*. Washington: July, 1938.
- U. S. Federal Trade Commission. *Report on the Beet Sugar Industry in the United States*. Washington: Government Printing Office, 1917.
- U. S. Senate. A Bill to Include Sugar Beets and Sugar Cane as Basic Agricultural Commodities Under the Agricultural Adjustment Act and For Other Purposes. *Hearings*. Seventy-third Congress, Second Session. Washington: Government Printing Office, 1934.
- U. S. Tariff Commission. Report No. 73, Second Series. *Report to the President on Sugar*. Washington: Government Printing Office, 1934.
- U. S. Works Progress Administration. Studies of Changing Techniques and Employment in Agriculture. Report No. A-1. *Sugar Beets*. Philadelphia: August, 1937.
- Utah Agricultural Experiment Station Circular No. 93. *Better Sugar Beet Culture in Utah*. Logan: April, 1931.
- Weekly Statistical Sugar Trade Journal*. New York: Willett and Gray.
- WELLS, DAVID A. *The Sugar Industry of the United States and the Tariff*. New York: Privately printed, 1878.

TOBACCO

- ARNOLD, B. W., JR. *History of the Tobacco Industry in Virginia from 1860 to 1894*. Baltimore: The Johns Hopkins Press, 1897.

- BAER, WILLIS N. *The Economic Development of the Cigar Industry in the United States*. Lancaster, Pennsylvania: Privately Printed, 1933.
- BILLINGS, E. R. *Tobacco*. Hartford: American Publishing Company, 1875.
- BOYD, W. K. *The Story of Durham*. Durham: Duke University Press, 1928.
- COX, REAVIS. *Competition in the American Tobacco Industry*. New York: Columbia University Press, 1933.
- FILLEY, H. C. *Cooperation in Agriculture*. New York: John Wiley & Sons, Inc., 1929. Chap. XVI.
- Great Britain Imperial Economic Committee. Report No. 31. *Tobacco*. London: His Majesty's Stationery Office, 1937.
- JENKINS, J. W. *James B. Duke, Master Builder*. New York: George H. Doran Company, 1927.
- Kentucky Agricultural Experiment Station. Bulletin No. 202. *A Preliminary Study of the Marketing of Burley Tobacco in Central Kentucky*. Lexington: State University Press, June, 1916.
- . Bulletin No. 288. *The Cooperative Marketing of Tobacco*. Lexington: State University Press, October, 1928.
- RAMSEY, ELIZABETH. *The History of Tobacco Production in the Connecticut Valley*. Smith College Studies in History, Vol. XV, Nos. 3-4. Northampton, Massachusetts: 1930.
- ROWE, HAROLD B. *Tobacco under the AAA*. Washington: The Brookings Institution, 1935.
- U. S. Department of Agriculture, Bureau of Agricultural Economics. *World Trade Barriers in Relation to American Agriculture*. Senate Document No. 70, Seventy-third Congress, First Session. Washington: Government Printing Office, 1933. Chap. X.
- . Circular No. 249. *American Tobacco Types, Uses, and Markets*, by Charles E. Gage. Washington: Government Printing Office, 1933.
- . Statistical Bulletin No. 58. *First Annual Report on Tobacco Statistics*. Washington: Government Printing Office, 1937.
- . Statistical Bulletin No. 63. *Annual Report on Tobacco Statistics, 1937*. Washington: Government Printing Office, 1938.
- U. S. v. American Tobacco Company*. 191 Fed. 371.
- U. S. v. American Tobacco Company*. 221 U. S. 106; 31 S. Ct. 632.
- U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Tobacco Division. *Tobacco Markets and Conditions Abroad* (Weekly).
- U. S. Commissioner of Corporations. Report on the Tobacco Industry, Part I. *Position of the Tobacco Combination in the Industry*. Feb. 25, 1909. Part II. *Capitalization, Investment, and Earnings*. Sept. 25, 1911. Part III. *Prices, Costs, and Profits*. Mar. 15, 1915. Washington: Government Printing Office.
- U. S. Congress. Hearings Before a Subcommittee of the Committee on Ways and Means, United States House of Representatives, Seventy-third Congress, Second Session. *Tobacco Taxes*. Washington: Government Printing Office, 1934.
- U. S. Federal Trade Commission. *The American Tobacco Company and the Imperial Tobacco Company*. Washington: Government Printing Office, 1926.
- . *Cooperative Marketing*. Washington: Government Printing Office, 1928. Chap. IX.

———. *Prices of Tobacco Products*. Washington: Government Printing Office, 1922.

———. *Report on the Tobacco Industry* (Dec. 11, 1920). Washington: Government Printing Office, 1922.

U. S. National Recovery Administration, Division of Review, Industry Studies Section, Tobacco Unit. *The Tobacco Study*. Washington: Mimeographed, March, 1936.

WERNER, C. A. *Tobaccoland*. New York: The Tobacco Leaf Publishing Company, 1922.

WOOFER, T. J. *The Plight of Cigarette Tobacco*. Chapel Hill: University of North Carolina Press, 1931.

WOOL

CHERRINGTON, PAUL T. *The Commercial Problems of the Woolen and Worsted Industries*. Washington: The Textile Foundation, Inc., 1932.

COLE, ARTHUR H. *The American Wool Manufacture*, Vols. I and II. Cambridge: Harvard University Press, 1926.

CONNOR, L. G. "A Brief History of the Sheep Industry in the United States," *Annual Report of the American Historical Association*, 1918. Washington: Government Printing Office, 1920.

COX, REAVIS. *The Marketing of Textiles*. Washington: The Textile Foundation, Inc., 1938.

DU PLESSIS, A. F. *The Marketing of Wool*. London: Sir Isaac Pitman & Sons, Ltd., 1931.

GARSDIE, ALSTON H. *Wool and the Wool Trade*. New York: Frederick A. Stokes Company, 1930.

GARSDIE, ALSTON H., and SOUTHWORTH, W. B. *The Wool Trade and Wool Top Industry*. 3d ed. New York: Wool Associates of the New York Cotton Exchange, Inc., 1930.

Great Britain Imperial Economic Committee. *World Consumption of Wool, 1928-1935*. London: His Majesty's Stationery Office, 1936.

HART, STANLEY H. *Wool, The Raw Materials of the Woolen and Worsted Industries*. Philadelphia: The Philadelphia Textile School of the Pennsylvania Museum and School of Industrial Art, 1917.

Harvard Business School, Bureau of Business Research. Bulletin No. 56. *Distribution of Textiles*. Cambridge: 1926.

Joint Report of the Executive Committee of the National Association of Wool Manufacturers and of the Executive Committee of the National Wool-Growers' Association, addressed to the United States Revenue Commission, February 9, 1866. Boston: John Wilson & Sons, 1866.

KAPLAN, EMANUEL. *A Way Forward for the Wool Industry*. New York: The Business Bourse, 1933.

MOHAT, HALDOR R. *The Tariff on Wool*. Madison: Tariff Research Committee, 1935.

National Association of Wool Manufacturers, Bulletin, Vol. LXVII. *Statistics of the Industry*. Boston: 1938.

Report of the Proceedings of the Convention of Delegates from the National Association of Wool Manufacturers and from the Several Organizations of the Wool Growers of the United States at Syracuse, New York, December 13, 1865. Boston: John Wilson & Sons, 1866.

- Robert Morris Associates, Research Committee, New England Chapter. *General Study of the Wool Industry*. Lansdowne, Pennsylvania: May, 1928.
- SMITH, MARK A. *The Tariff on Wool*. New York: The Macmillan Company, 1926.
- TAUSSIG, F. W. *Some Aspects of the Tariff Question*. 3d ed. Cambridge: Harvard University Press, 1931.
- U. S. Department of Agriculture, Bureau of Agricultural Economics. *Livestock, Meats, and Wool Market Statistics and Related Data, 1938*. Washington: Government Printing Office, May, 1939.
- U. S. Farm Credit Administration. Cooperative Division. Bulletin No. 3. *Cooperative Marketing of Agricultural Products*. Washington: Government Printing Office, February, 1936.
- . Cooperative Division. Bulletin No. 6. *Statistics of Farmers' Cooperative Business Organizations*. Washington: Government Printing Office, May, 1936.
- U. S. Federal Trade Commission. *Cooperative Marketing*. Senate Document No. 95, Seventieth Congress, First Session. Washington: Government Printing Office, 1928.
- U. S. Senate. Special Committee to Investigate the Production, Transportation, and Marketing of Wool. *Hearings*. Seventy-fifth Congress, Third Session. Washington: Government Printing Office, 1938.
- VON BERGEN, W., and MAUERSBERGER, H. R. *American Wool Handbook*. New York: American Wool Handbook Company, 1938.
- Wharton School of Finance and Commerce. Industrial Research Department. Research Studies VII. *Analysis of Production of Worsted Sales Yarn*, by Alfred H. Williams, Martin A. Brumbaugh, and Hiram S. Davis. Philadelphia: University of Pennsylvania Press, 1929.
- . Industrial Research Department Monographs. Wool Series, No. 1. *Production and Equipment Trends in American Worsted Yarn Manufacture, 1919-1932*, by H. S. Davis and G. F. Brown. Philadelphia: University of Pennsylvania Press, September, 1933.



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